USER MANUAL

8/16 CHANNELS

DIGITAL VIDEO RECORDER

INSTRUCTION MANUAL

To obtain the best performance and ensure device function correctly, please read this instruction manual carefully and completely.

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FCC Compliance

USER-INSTALLER CAUTION: YOUR AUTHORITY TO OPERATE THIS FCC VERIFIED EQUIPMENT COULD BE VOIDED IF YOU MAKE CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE TO PART 15 OF THE FCC RULES.

NOTE: THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

THIS CLASS A DIGITAL APPARATUS MEETS ALL REQUIREMENTS OF THE CANADIAN INTERFERENCE-CAUSING EQUIPMENT REGULATIONS.

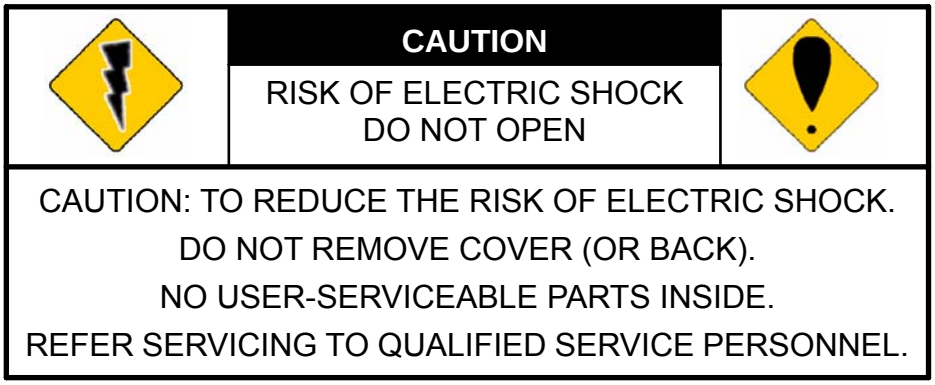
WARNINGS, CAUTIONS & COPYRIGHT

WARINGS

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MISTURE.

DO NOT INSERT ANY METALLIC OBJECT THROUGH VENTILATION GRILLS.

CAUTION


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK.
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Explanation of Graphical Symbols

	The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of insinuated "dangerous voltage" within the products enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral rhombus is intended to alert the user to the presence of important operating and maintenance (servicing) instruction in the literature accompanying the product.

USERS OF THE SYSTEM ARE RESPONSIBLE FOR CHECKING AND COMPLYING WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND STATUTES COIPCERNING THE MONITORING AND RECORDING OF VIDEO AND AUDIO SIGNALS. ULTRAK SHALL NOT BE HELD RESPONSIBLE FOR THE USE OF THIS SYSTEM IN VIOLATION OF CURRENT LAWS AND STATUTES.

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THE TRADEMARKS MENTIONED IN THE MANUAL ARE LEGALLY REGISTERED TO THEIR RESPECTIVE COMPANIES.

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1 INTRODUCTION

1.1 FEATURE

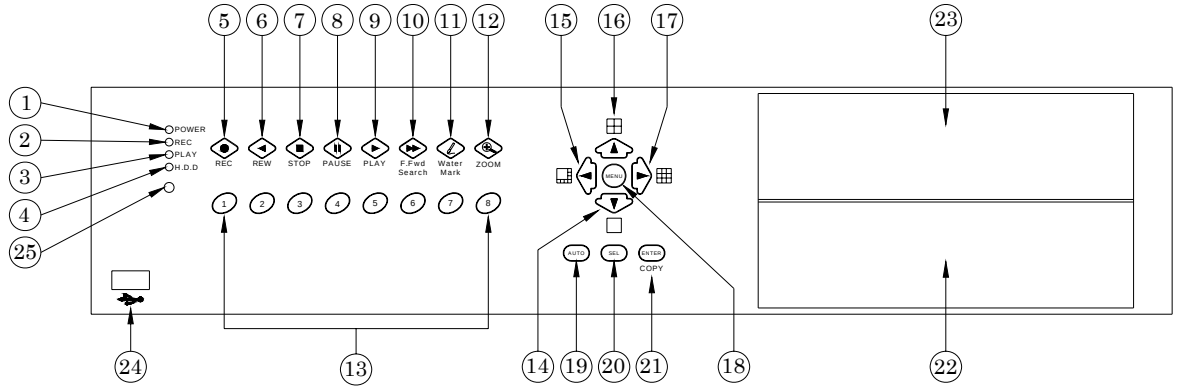
- EASY OPERATION, SETTING CAN BE EASILY MODIFIED ON SCREEN DISPLAY.
- MULTI-SPEED RECORDING SELECTION ON NORMAL OR ALARM RECORDING MODE UP TO 120/100 (NTSC / PAL) PICTURES PRE SECOND.
- SHUTTLE FOR FAST/SLOW VIEWING, JOG DIAL FOR PICTURE BY PICTURE PLAYBACK.
- BUILD-IN IR & RS-232/485 PORT READY FOR REMOTE CONTROL & SUB-CONTROL PANELS ADD ON IN THE FUTURE.
- SUPPORT CDRW, USB & NETWORK BACKUP.

1.2 SPECIFICATION

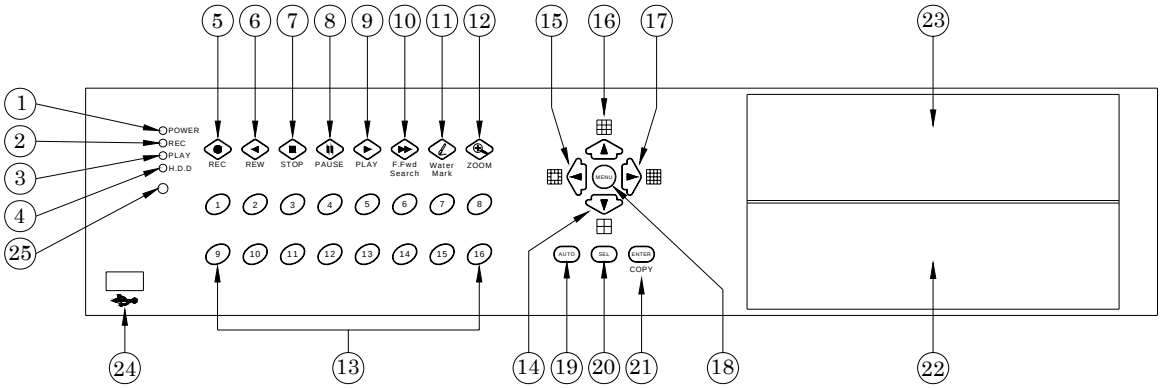
IMAGE SYSTEM	NTSC	PAL
RESOLUTION-LIVE	720×480	720×576
VIDEO INPUT	BNC × 8 / BNC x16	
VIDEO LOOPING	BNC × 8 / BNC x16	
VIDEO OUTPUT	BNC × 1	
SPOT OUTPUT	BNC × 1	
AUDIO INPUT	RCA × 1	
AUDIO OUTPUT	RCA × 1	
STORAGE MEDIA	MAX 2 IDE HARD DISKS (ONE REMOVABLE)	
IMAGE FORMAT	M-JPEG	
RECORDING RATE	720 x 240 up to 60 PPS 320 x 240 up to 120 PPS	720 x 288 up to 50 PPS 320 x 288 up to 100 PPS
RECORDING MODE	MANUAL / ALARM / SCHEDULE	
PLAYBACK SPEED	FAST FORWARD ×2 ×4 ×6 ×8 ×16 x32 FAST BACKWARD ×2 ×4 ×6 ×8 ×16 PICTURE BY PICTURE PLAYBACK	
TITLE	6 CHARACTERS FOR EACH CAMERA	
OSD & SETUP	TITLE / TIME / DATE / SETUP MENU	
ALARM INPUT	×9 / x16 N.O. OR N.C. PROGRAMMABLE	
RELAY OUTPUT	N.O. OR N.C. PROGRAMMABLE CONTACT ×1	
RS-232 & RS-485 PORT	YES	
PTZ CONTROL	YES	
ETHERNET	YES	
IR REMOTE CONTROL	YES	
BACKUP	USB, CDRW & NETWORK	
VGA OUTPUT	OPTION	
PASSWORD CONTROL	ONE FOR SYSTEM, ONE FOR HDD FORMAT	
KEY LOCK	YES	
POWER INPUT	AC 100-240V INPUT (47-63 HZ)	
DIMENSIONS MM	430(W) × 91(H) × 380(D)	
RACK MOUNTABLE	EIA 19” 2U STANDARD MOUNTING RACK	

2 HARDWARE OVERVIEW

2.1 FRONT PANEL


5 6 7 8 9 10 11 12 15 16 17 23
1 2 3 4 25
POWER
REC
PLAY
H.D.D
REC REW STOP PAUSE PLAY F.Fwd Search Water Mark ZOOM
1 2 3 4 5 6 7 8
AUTO SEL ENTER COPY
24 13 14 19 20 21 18 22

Front Panel of 8-ch DVR


5 6 7 8 9 10 11 12 15 16 17 23
1 2 3 4 25
POWER
REC
PLAY
H.D.D
REC REW STOP PAUSE PLAY F.Fwd Search Water Mark ZOOM
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
AUTO SEL ENTER COPY
24 13 14 19 20 21 18 22

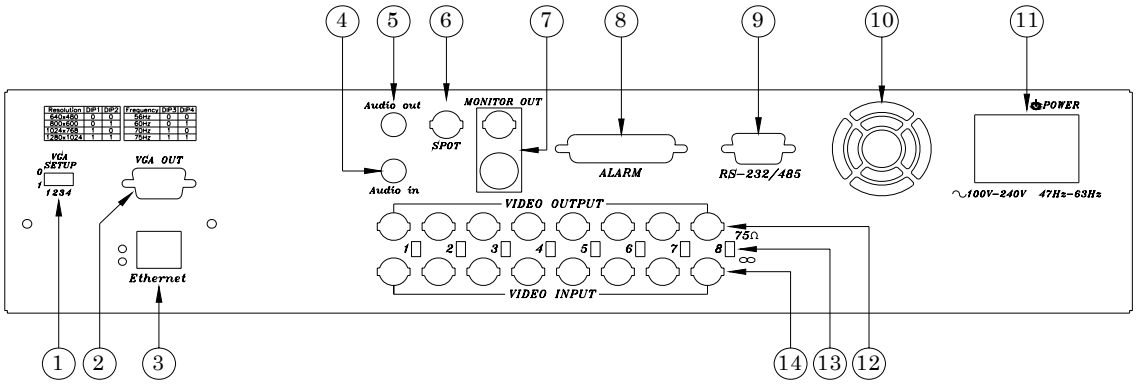
Front Panel of 16-ch DVR

DVR OPERATION

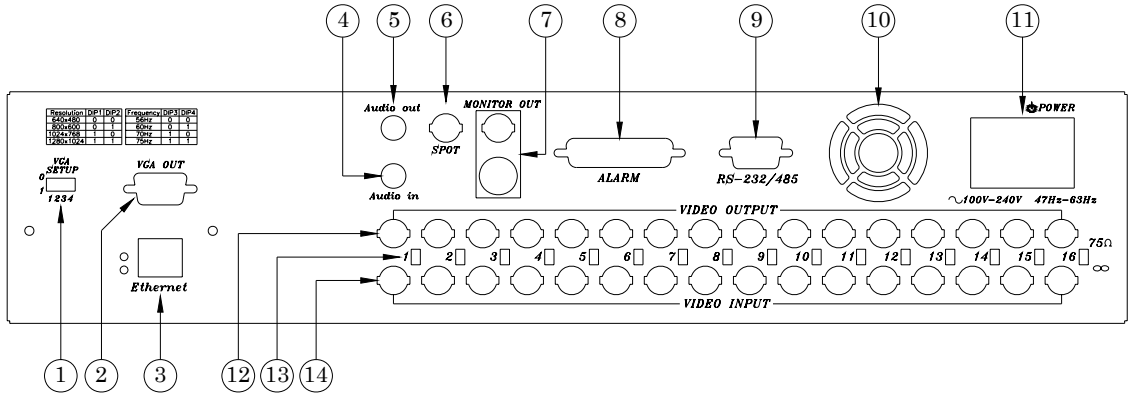
NO.	LABEL	OPERATION	PTZ
1	**POWER**	Power LED	
2	**REC**	Recording LED	
3	**PLAY**	Play LED	
4	**H.D.D**	H.D.D LED	
5	●	Press REC to start recording. Press again to stop.	
6	◀	Press the Rew button to play video backward.	Zoom out
7	■	Press Stop to stop playback	
8	‖	Press Pause to pause video playback	
9	▶	Press the Play button to play video forward.	Zoom in
10	▶▶	Press F. Fwd to play video forward at high speed. Press the button again the speed will be change circulative from ×2,×4,×6,x8,x16 to the highest ×32.	
11	Water Mark	During playback press Water Mark to enable this mark.	
12	ZOOM	During live viewing mode support 2x zoom in function.	

13	1-9 / 1-16	Press the button to display full screen.	
14	▼	Move downward or decrease the number. Select **full/quad** formats at **8/16-ch DVR** model.	Down
15	◄	Move leftward or decrease the number Select **8/13** camera formats at **8/16-ch DVR** model.	Left
16	▲	Move upward or increase the number. Select **quad/9** camera formats at **8/16-ch DVR** model.	Up
17	►	Move rightward or increase the number Select **9/16** camera formats at **8/16-ch DVR** model.	Right
18	MENU	Press MENU to go into or exit main menu	PTZ setup
19	AUTO	Press AUTO to switch channel by channel automatically.	Auto Scan
20	SEL	Press this button to select the different assembled of camera formats.	Enter or exit PTZ mode
21	ENTER/ COPY	Press ENTER button to make choose or move cursor forward or make confirm in MENU system. / Backup video or picture to USB or CDRW.	Home
22	CDRW	Slot for CDRW.	
23	HDD	Location of installation for removable HDD.	
24		USB connector	
25	O	IR Sensor for remote control	

2.2 BACK PANEL



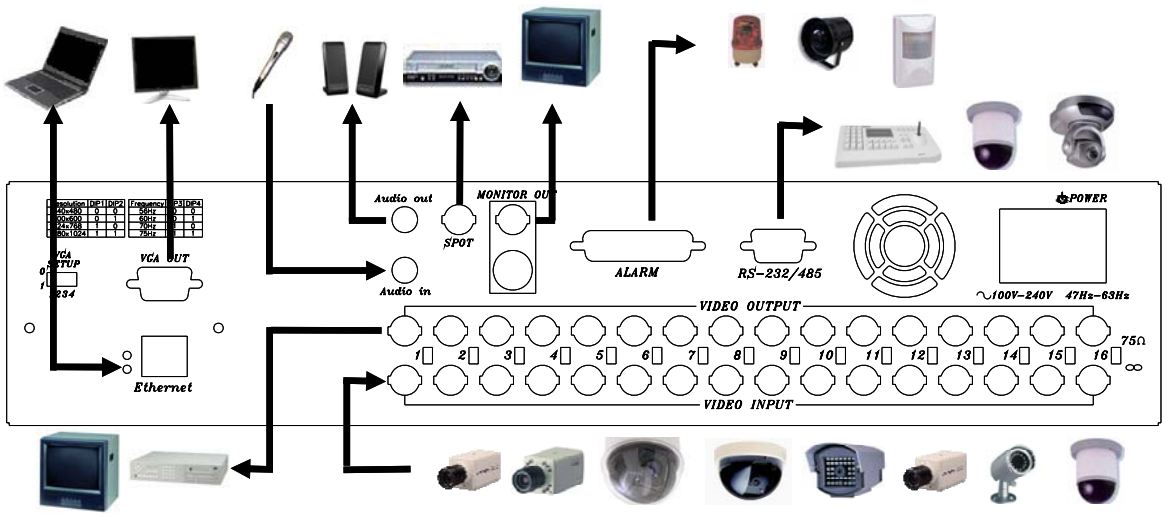
Back panel of 8-ch DVR



Back panel of 16-ch DVR

NO.	LABEL	OPERATION
1	VGA SETUP DIP	Setting Resolution & Frequency
2	VGA D-SUB OUT	Connect to CRT or LCD monitor.
3	ETHERNET	RJ-45 connector for networking.
4	AUDIO IN	Audio input for 1 channel
5	AUDIO OUT	Audio output for 1 channel
6	SPOT	SPOT Video output
7	MONITOR OUT	Video output with BNC & Y/C signal Din connector.
8	ALARM	25 pin D-Sub connector. Alarm input connector.
9	RS-232 / RS-485	9 pin D-Sub connector. For external control of unit.
10	FAN	Cooling fan.
11	POWER	Power switcher: AC100V~AC240V / 47-63Hz input.
12	Video output	Video output with BNC connector.
13	75 ohm	Switch between 75 ohm and high resistance.
14	Video input	Video input with BNC connector.

3 SYSTEM CONNECTION



3.1 CAMERA & MONITOR LOOPING

75 Ω: If camera looping to other devices or channels and video single are instable, please switch to this position.

∞: In case of camera input over bright that please switches to this position.

Here recommend link cameras by sequence to avoid unexpected image broken, from CH1, CH2, CH3, CH4…….

3.2 EXTERAL ALARM

There are three types of alarms that the system can be configured to handle. They are Motion detection Alarm, External Alarm and Video Loss Alarm.

Motion detection Alarm and External Alarm:

When motion detection or External Alarm was triggered, there are 5 possible actions will be taken.

a. Changes recording speed as alarm recording speed.
b. Monitor will display corresponding full screen alarm channel, it will switch automatic mode to manual mode if buttons pressing activity occurred in 5 seconds.
c. Relays can be activated by motion detection or external alarm when turning on.
d. External alarm will be recorded in the event list. Motion detection can be set to yes or no.
e. The camera title will be transformed into color of yellow when motion is happening, “ALARM” text will show up when external alarm is triggered.

Video Loss Alarm:

The default setting of Video Loss alarm is enabled and cannot be changed. Although buzzer action can be disabled, an ALM record will still be added to the Event List that indicates the precise time of video loss.

25 PIN D-Sub connector is used for external alarm input. It will accept TTL/CMOS type trigger signals where the **8ch & 16ch DVR** alarm inputs will be set by signal polarity. It also accepts contact type devices. For example, N.O. relay input, the Alarm Polarity should set to LOW in the ALARM SETUP menu. For N.C. relay input, the Alarm Polarity should set to HIGH in the ALARM SETUP menu.

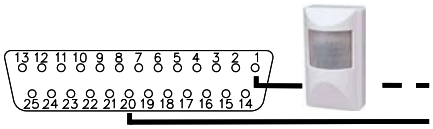
Connector pins 1-16 are for TTL/CMOS compatible alarm signals or for connect one side of the contact type devices. Connector pins 20-21 are for input signal grounding or the remaining side of the contact type devices.

The alarm hold input accept TTL/COMS alarm signal as well as contract device. The connector pin 22 connected to Alarm Reset. The Alarm Reset signal return connects to ground pin (pin 20-21).

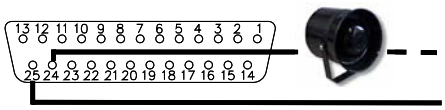
Alarm output is Relay Type, Pin 23 is Normal Close and Pin 25 is Normal Open. These outputs can be used to control external devices.

D-SUB25	PIN	DEFINE
	1-9, (1-16)	Alarm 1-Alarm 9 (16) Camera alarm input
	10-19, (17-19)	N/A
	20, 21	GND (connecting to ground)
	22	Alarm Reset
	23	Alarm output, N.C.
	24	Relay COM
	25	Alarm output, N.O.

EXAMPLE 1: Connect with PIR (Passive Infrared) device from ALARM1 INPUT.
EXAMPLE 2: A Normal off (Normal Open) alarm siren at Alarm Output.

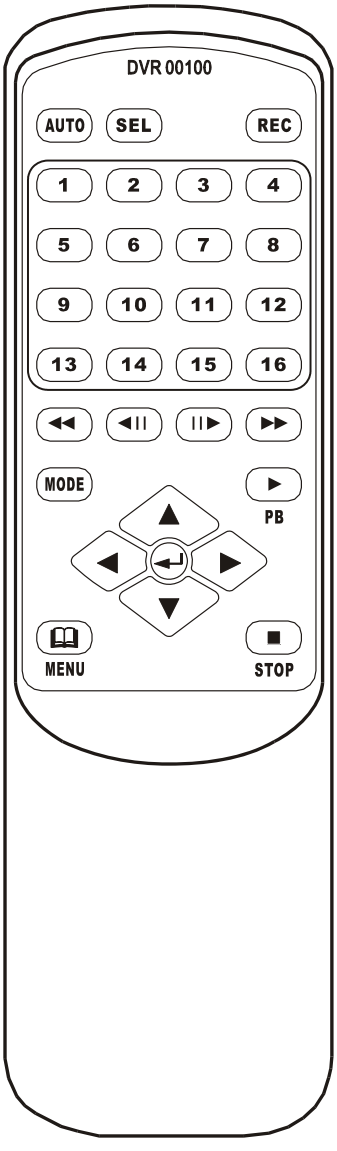


EX1



EX2

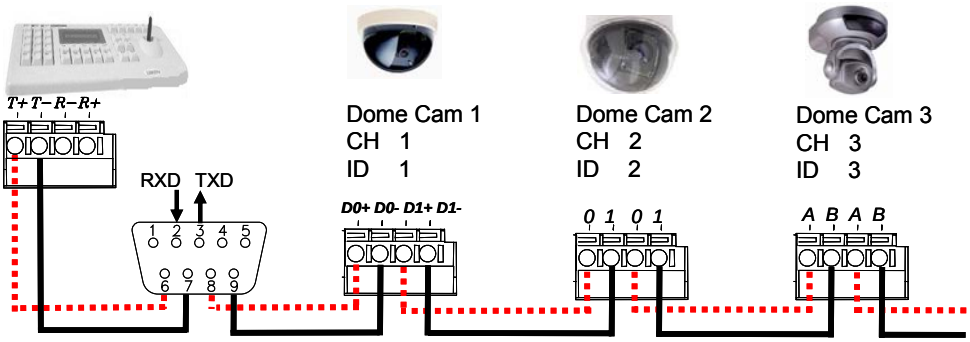
3.3 IR REMOTE CONTROL



ITEM	
AUTO	Press AUTO to switch channel by channel automatically.
SEL	Press this button to select the different assembled of camera formats.
.**REC**	Press REC to start recording & again to stop.
1-8/1-16	Press the button to select the channel for full screen.
◀◀	Fast backward
◀II	Picture by picture backward play
II▶	Picture by picture forward play
▶▶	Fast forward
▶	Play video forward
MODE	Change screen format
▲	Move upward or increase.
►	Move right or increase.
▼	Move downward or decrease.
◄	Move left or decrease.
↵	To enter item or make choose.
MENU	To into or exit main menu
STOP	Stop the playback

3.4 RS-232/485 CONTROLLER

	PIN	DEFINE	
RS-232	2	RXD	
	3	TXD	
	5	GND	
RS-485	6	RXDA	R+
	7	RXDB	R-
	8	TXDZ	T+
	9	TXDY	T-



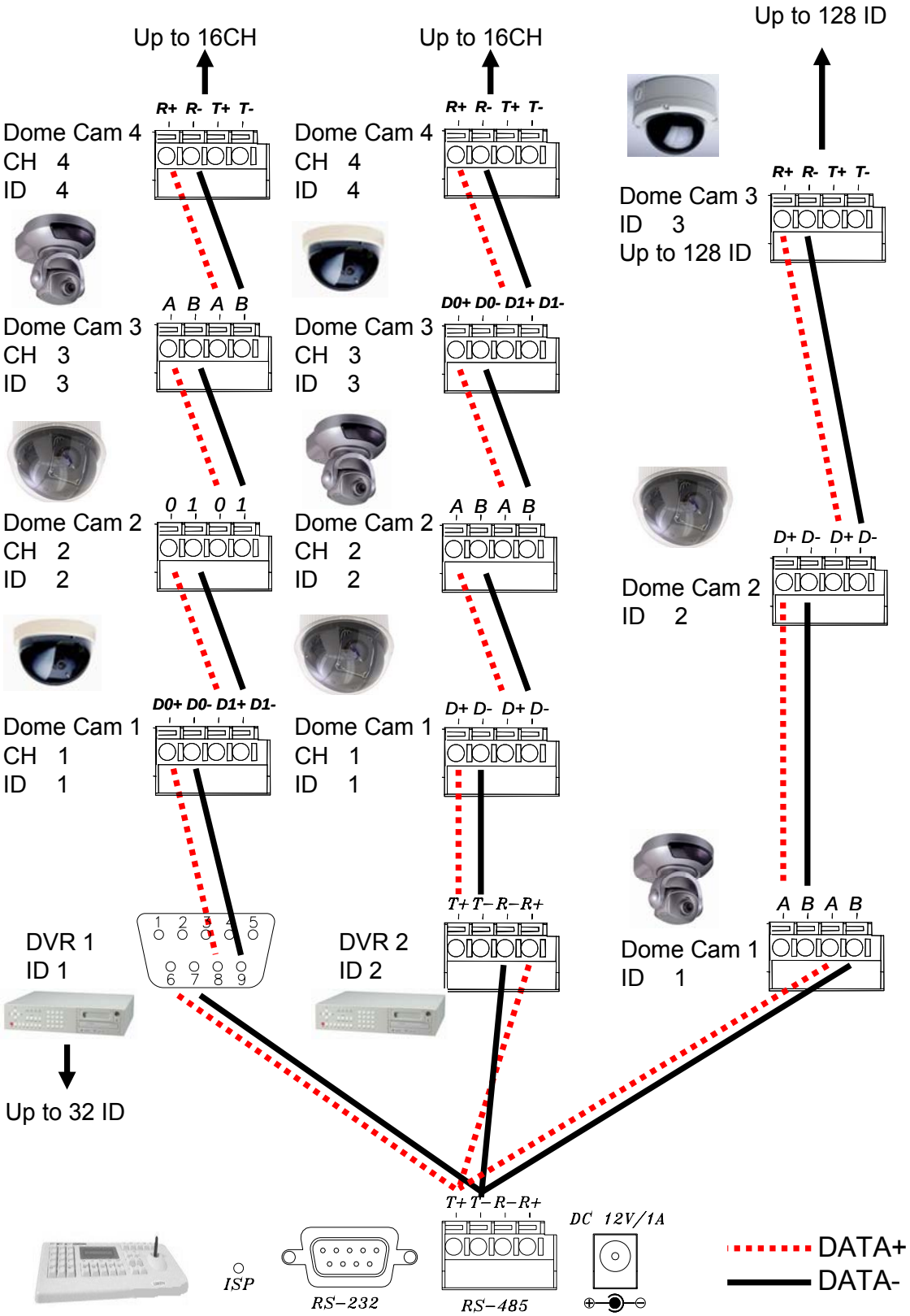
Data format
Data: 1 Byte / Parity: None / Start bit: 1 / Baud: 9600
Totally 3 bytes in data frame:

1. Byte=0x10 :Broadcasting DVR
   Byte=0x80+ID Number :Remote Control DVR (ID number range: 5~21)
2. Byte=Refer to below table :Command for each key string
3. Byte=First byte plus Second byte :Command for confirm checksum

8-ch DVR	16-ch DVR	Command		8-ch DVR	16-ch DVR	Command
F.Rew	F.Rew	0x38		Rew	Rew	0x3a
Picture Rew	Picture Rew	0x3b		STOP	STOP	0x3c
Picture Fwd	Picture Fwd	0x3d		PLAY	PLAY	0x39
F.Fwd	F.Fwd	0x3e				
		0x32				0x31
		0x33				0x34
ENTER	ENTER	0x35		AUTO	AUTO	0x37
SEL	SEL	0x36				
1	1	0x11		2	2	0x12
3	3	0x13		4	4	0x14
5	5	0x15		6	6	0x16
7	7	0x17		8	8	0x18
9	9	0x19			10	0x1a
	11	0x1b			12	0x1c
	13	0x1d			14	0x1e
	15	0x1f			16	0x30

3.5 PTZ (PAN, TILT AND ZOOM) CAMERA & JOYSTICK CONTROLLER

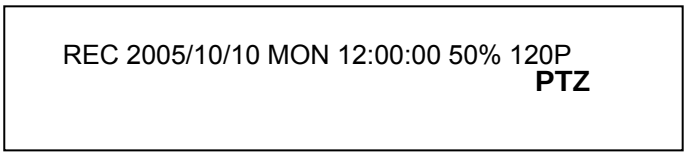
Following diagram for DVR connect between PTZ camera & joystick controller, for DVR to control PTZ camera please make sure the CAMERA ID, BANDRATE (default at 9600 bps) and RS-485 cable, if link with joystick controller please confirm your DVR ID number. Every DVR ID & the PTZ camera ID behind DVR must be unique.



PTZ SETUP & FRONT PLANE CONTROL

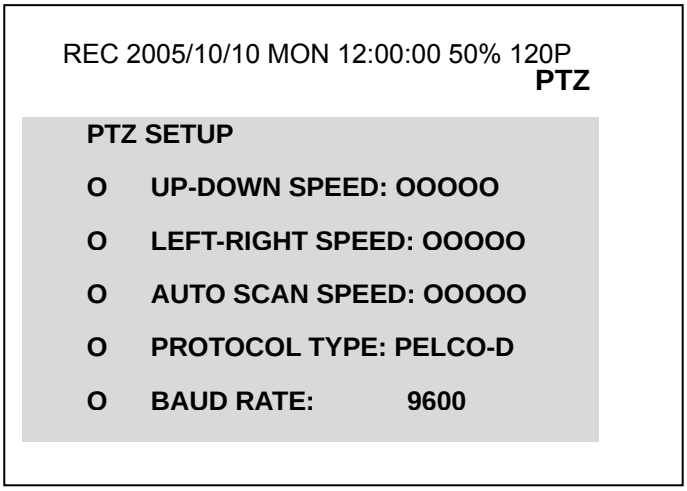
EXAMPLE :
A PTZ camera at channel 3 with PELCO-D, 9600bps.

1. Press the channel button **3** into full screen mode.
2. Press SEL and “PTZ” mark appear at left upper corner.



3. Press the **MENU** button into setup mode.

   By ▲ or ▼ to switch item & by ◄ or ► to change SPEED/ PROTOCOL & BAUD RATE.



4. Press the **MENU** button again back to PTZ control mode.

5. With following label to control PTZ camera.

NO.	LABEL	PTZ
14	▼	Down
15	◄	Left
16	▲	Up
17	►	Right
9	MENU	PTZ setup

NO.	LABEL	PTZ
5	PLAY	Zoom in
21	ENTER	Home
19	AUTO	Auto Scan
6	REW	Zoom out
20	SEL	Enter or exit PTZ mode

6. Press the **SEL** button quite to PTZ control mode.

3.6 VGA OUTPUT

VGA output is optional, please ensure that you have proper DVR model for VGA out put installation. By D-SUB connecter to CRT or LCD monitor, DIP switch definition & suggestion table as below:

Resolution	DIP1	DIP2
VGA 640×480	0	0
SVGA 800×600	0	1
XGA 1024×768	1	0
SXGA 1280×1024	1	1

Frequency	DIP3	DIP4
56Hz	0	0
60Hz	0	1
70Hz	1	0
75Hz	1	1

DIP1	DIP2	DIP3	DIP4	Resolution	Frequency	Monitor
0	0	0	0	VGA 640×480	60	15 inch or below
0	0	0	1			
0	0	1	0		72	
0	0	1	1		75	
0	1	0	0	SVGA 800×600	56	15 inch or below
0	1	0	1		60	
0	1	1	0		72	
0	1	1	1		75	
1	0	0	0	XGA 1024×768	60	15~17 inch
1	0	0	1			
1	0	1	0		70	
1	0	1	1		75	
1	1	0	0	SXGA 1280×1024	60	17 inch or above
1	1	0	1			
1	1	1	0			
1	1	1	1			

3.7 NETWORK

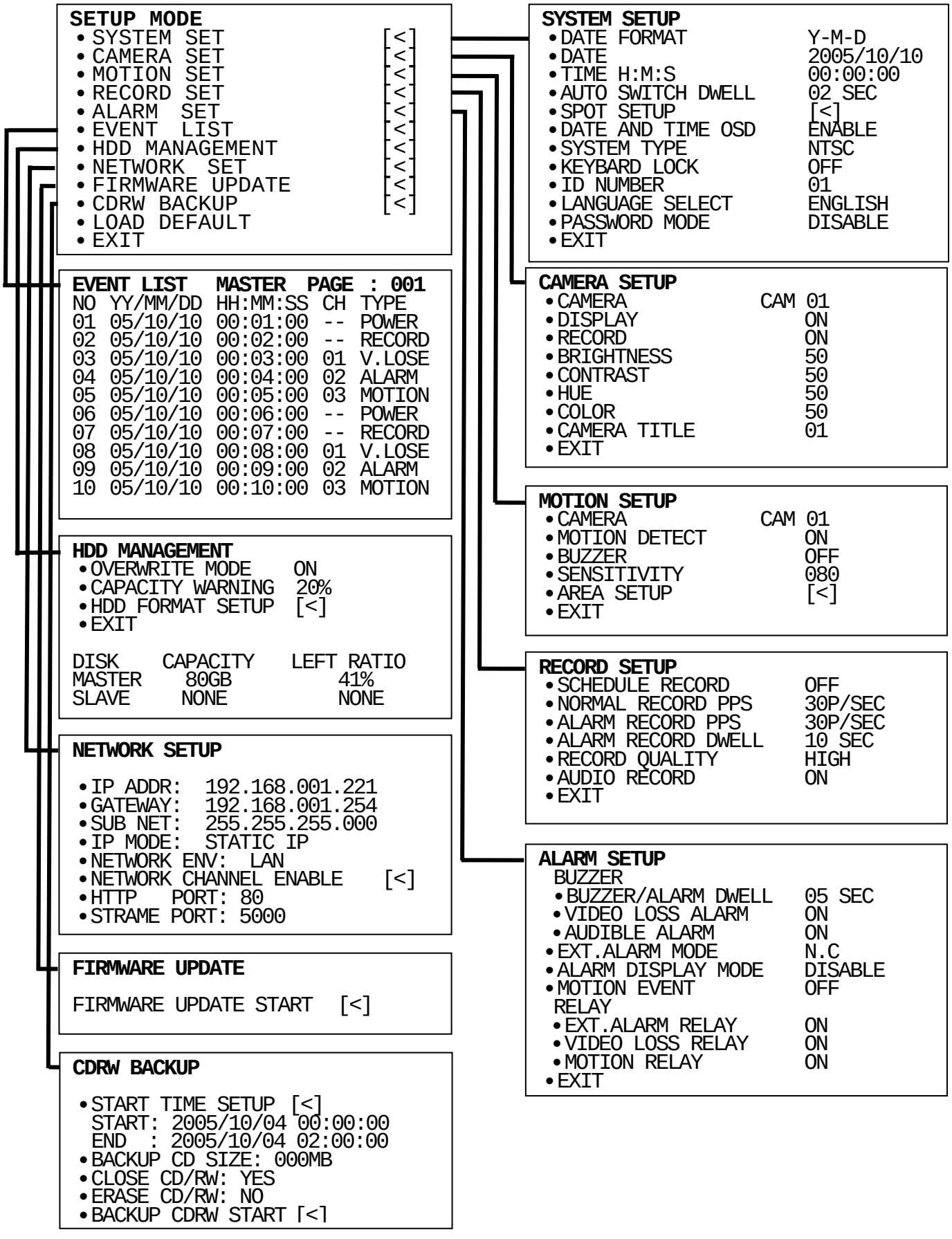
Before starting the network application software, please confirm the RJ-45 cable has been connected, and then turn the power on.

DVR would check network connection status while DVR power on, thus without network connection the network function will be disabled.

Please make sure your network environment enabled and RJ-45 cable been connected, before DVR power up!

4 SYSTEM SETUP

4.1 SETUP MENU DIAGRAM



4.2 LIVE VIEWING

A. Status indicator:

To press **ENTER** key to switch live display indicator in the live viewing mode.

	REC	TIME & DATE	CHANNEL ID	HDD STATUS & PPS
1	O	O	O	O
2	O	O		O
3		O	O	
4		O		

B. Quick playback search

During live viewing mode and press key into quick time search or event list search mode.

C. PTZ control:

A. Press the channel key in full screen mode.
B. Press **SEL** key into PTZ mode, and a yellow PTZ mark at right upper corner.
C. Press **MENU** key to setup PROTOCOL & BAUDRATE between DVR & PTZ.
D. Press direction key to control the PTZ camera.
E. Press **SEL** key to exit PTZ mode.

D. Channel AUTO switch

Press **AUTO** key system would into full screen auto switch mode, and press **AUTO** key again back to normal screen.

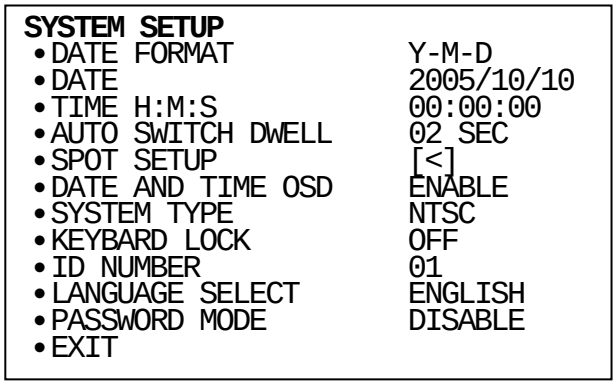
E. Channel selection

During split channel mode the windows will be limited, thus using the **SEL** key to switch others channel on the screen.

F. Zoom

Press **ZOOM** button to enable zoom in function by direction & enter key to decide zoom in area, and press enter key again back to normal mode.

4.3 SYSTEM SETUP



▲ or ▼ to change item
◄ or ► to change value

A. DATA FORMAT
By ◄ or ► to switch Y-M-D, M-D-Y or D-M-Y mode.

B. DATE
By ▲ or ▼ to switch item & by ◄ or ► to change value.

C. TIME
By ▲ or ▼ to switch item & by ◄ or ► to change value.

D. AUTO SWITCH DWELL
By ◄ or ► to change volume.

E. SPOT SETUP
Press **ENETR** into SOPT STEUP mode or **MENU** to exit,
By ▲ or ▼ to switch item & by ◄ or ► to change value.

F. DATE AND TIME OSD
By ▲ or ▼ to switch item & by ◄ or ► to change value.

G. SYSTEM TYPE
By ◄ or ► to change value between NTSC / PAL / EIA / CCIR.
The DVR would switch system type automatically, after press **MENU** key.

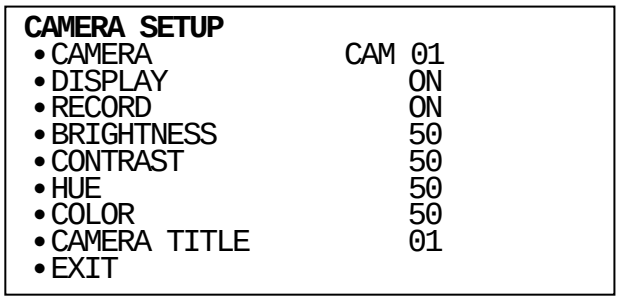
H. KEYBOARD LCOK
By ◄ or ► to change value between OFF / TYPE1 / TYPE 2.
TYPE 1: Block all function but channel switch.
TYPE 2: Block all function.
After KEYBOARD LCOK mode setup, please setup the **PASSWORD** !
If without password, the un-authorized user would access into SYSTEM SETUP and remove keyboard lock function easily!

I. ID NUMBER
By ◄ or ► to change value.
This ID number identifies the DVR location between DVR & remote controller or joystick controller.

J. LANGUAGE SELECT
By ◄ or ► to change OSD language.

K. PASSWORD MODE
By ▲ or ▼ to switch item & by ◄ or ► to change value.
Default password number is "1111".

4.4 CAMERA SETUP



▲ or ▼ to change item
◄ or ► to change value

A. CAMERA
By ◄ or ► to change camera channel.

B. DISPLAY
By ◄ or ► to change value for this camera would display on screen or not.

C. RECORD
By ◄ or ► to change value for this camera would include with the recording or not.

D. BRIGHTNESS
By ◄ or ► to change brightness level.

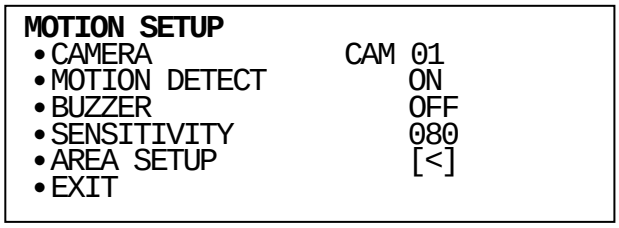
E. CONTRAST
By ◄ or ► to change contrast level.

F. HUE
By ◄ or ► to change HUE level.

G. COLOR
By ◄ or ► to change color level.

H. CAMERA TITLE
By ▲ or ▼ to switch item & by ◄ or ► to change wording.

4.5 MOTION SETUP



▲ or ▼ to change item
◄ or ► to change value

A. CAMERA
By ◄ or ► to change value for camera motion setup.

B. MOTION DETECT
By ◄ or ► to change value for motion detect function.

C. BUZZER
By ◄ or ► to change value for buzzer or not while motion detected.

D.SENSITIVITY
By ◄ or ► to change sensitivity value from 001 (min) to 100 (max).

E. AREA SETUP
Press **ENTER** key to enter motion area setting.

1. Press direction key to select which block need to change.
2. Press **AUTO** to add a line to motion detection.
3. Press **SEL** to remove a line to motion detection.
4. Press **MENU** key to quit motion detection area setup.

4.6 RECORD SETUP

```
RECORD SETUP
 • SCHEDULE RECORD          OFF
 • NORMAL RECORD PPS        30P/SEC
 • ALARM RECORD PPS         30P/SEC
 • ALARM RECORD DWELL       10 SEC
 • RECORD QUALITY           HIGH
 • AUDIO RECORD             ON
 • EXIT
```

▲ or ▼ to change item
◄ or ► to change value

A. SCHEDULE RECORD

By ◄ or ► to change value for schedule recording function.

A1.SCHEDULE RECORD SETUP

While SCHEDULE RECORD at ON, press **ENTER** key into SCHEDULE RECORD diagram.

```
RECORD SETUP

WEEKDAY: MON-FRI
START-STOP  TYPE    PPS     ALM PPS
  01-00     [X]     30P       60P

  00-01     [0]     30P       60P

WEEKEND: SAT-SUN
START-STOP  TYPE    PPS     ALM PPS
  ALL-TIME  [X]     30P       60P


EXIT
```

▲ or ▼ to change item
◄ or ► to change value

A1.1
WEEKDAY & WEEKEND

The week days separated into 2 area weekday & weekend.

EXAMPLE 1:
If weekday are from Monday to Friday, thus the weekend must be Saturday to Sunday.

EXAMPLE 2:
If weekday are from Wednesday to Friday, thus the weekend must be Saturday to Tuesday.

EXAMPLE 3:
If weekday are from Monday to Wednesday, thus the weekend must be Wednesday to Sunday.

	MON	TUE	WEB	THU	FRI	SAT	SUN
EX1	WEEKDAY					WEEKEND	
EX2	WEEKEND		WEEKDAY			WEEKEND	
EX3	WEEKDAY			WEEKEND			

A1.2
START-STOP
The 24 hours can be ALL TIME & separated hour's mode.

ALL TIME

Using the same recording type & PPS in whole day.

Separated hour's
As like weekday & weekend setting, every 24 hours can be separated 2 areas.

EXAMPLE 1:
Business hours form 8am-16pm, and 16pm-8am off.

EXAMPLE 2:
Business hours form 10am-20pm, and 20pm-10am off.

	2	4	8	6	10	12	14	16	18	20	22	24
EX1	OFF		BUSINESS HOURS						OFF			
EX2	OFF				BUSINESS HOURS						OFF	

A1.3
TYPE
By ◄ or ► to change recording type mode.

A	Alarm recording only.
O	Full time recording.
X	No recording.

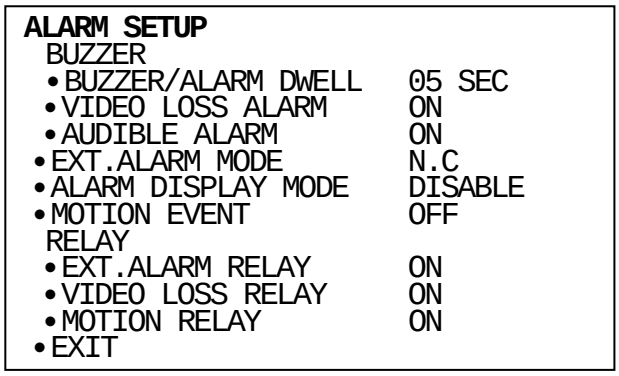
A1.4
PPS
By ◄ or ► to change normal recording picture pre second.
A1.5
ALM PPS
By ◄ or ► to change alarm recording picture pre second.

NTSC 120 / 60 / 30 / 15 / 10 / 5 / 3 / 2 / 1 PPS.
PAL 100 / 50 / 25 / 12 / 10 / 5 / 3 / 2 / 1 PPS.

Even the camera RECORD been turn off from CAMERA SETUP, during 120/100 PPS mode system would sharing PPS to each channel automatically.

B. NORMAL RECORD PPS
By ◄ or ► to change how many picture pre second in normal recording.
C. ALARM RECORD PPS
By ◄ or ► to change how many picture pre second in alarm recording.
D. ALARM RECORD DWELL
By ◄ or ► to change how many second recording while alarm occurs.
E. RECORD QUALITY
By ◄ or ► to change recording quality for LOW / MEDIUM / HIGH / BEST.
F. AUDIO RECORD
By ◄ or ► to decide included with audio recording or not.

4.7 ALARM SETUP



▲ or ▼ to change item
◄ or ► to change value

BUZZER

A. BUZZER/ALARM DWELL

By ◄ or ► to change how many second buzzer while alarm occurs.

B. VIDEO LOSS ALARM

By ◄ or ► to change value for video loss alarm.

C. AUDIBLE ALARM

By ◄ or ► to change value for audible alarm.

D. EX. ALARM MODE

By ◄ or ► to change value for external alarm device.
N.C: For Normal Close device as like infrared detecter.
N.O: For Normal Open device as like alarm siren or etc.

E. ALARM DISPLAY MODE

By ◄ or ► to change value for alarm display mode.

F. MOTION EVENT

By ◄ or ► to change value for adds the detected motion into event list or not.

RELAY

G. EXT. ALRAM RELAY

By ◄ or ► to change value for triggered the relay from external alarm device.

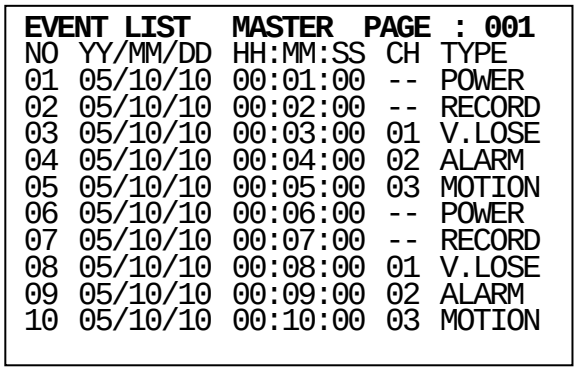
H. VIDEO LOSS REPLAY

By ◄ or ► to change value for triggered the relay while video loss occurs.

I. MOTION RELAY

By ◄ or ► to change value for triggered the relay if motion been detected.

4.8 EVENT LIST



▲ or ▼ to change item
◄ or ► to change page

A. NO

By ▲ or ▼ to switch event item & by ◄ or ► to pages.
In the event list each hard disk would stored 2000 pieces event, with 2 hard disks would be up to 4000 pieces, and header information bar would show the event belong to which hard disk.

B. DD/MM/YY

The Year/Month/Day, Month/Day/ Year or Day/Month/Year depend on date format from SYSTEM SETUP.

C. HH:MM:SS

The Hour/Minute/Second for event starts time of this event.

D. CH

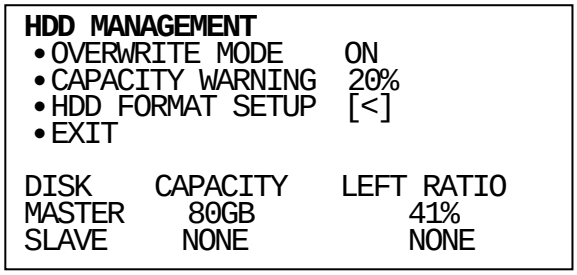
Channel number, depend on what event type with specific channel.

E. TYPE

Following issues would list on event list**.**

POWER	If DVR been turn off, power up time would add on the list.
RECORD	If the record bottom been pressed.
V.LOSE	If a camera signal lose and channel number would on the list.
ALARM	If alarms been triggered this event would on the list.
MOTION	If motion been detected this event & channel would on the list.

4.9 HDD MANAGEMENT



▲ or ▼ to change item
◄ or ► to change page

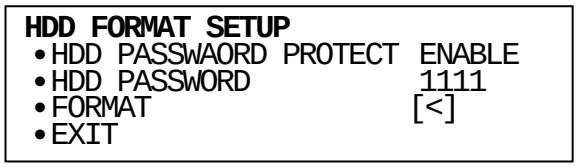
A. OVERWRITE MODE

By ◄ or ► to change value for overwrite or non-overwrite mode.

B. CAPACITY WARNING

By ◄ or ► to change the 20 / 15 / 10 / 5% for non-overwrite alarm.

C. HDD FORMAT SETUP



C-1. HDD PASSWORD PROTECT

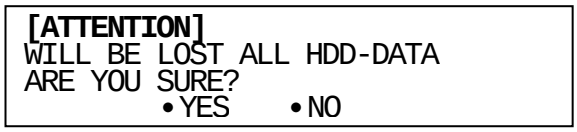
By ◄ or ► to change value for hard disk format password protection

C-2. HDD PASSWORD

By ▲ or ▼ to change item & by ◄ or ► to change value.
Preset password: 1111

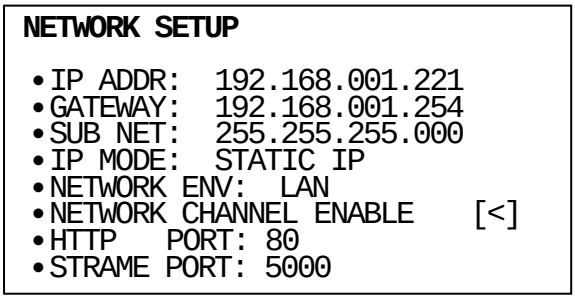
C-3. FORMAT

Press **ENTER** key into hard disk format diagram.



By ◄ or ► to decide YES or NO, and press **ENTER** key to execute.

4.10 NETWORK SETUP



▲ or ▼ to change item
◄ or ► to change page

A. IP ADDR
By ▲ or ▼ to switch item & by ◄ or ► to assign an IP address number.

B. GATEWAY
By ▲ or ▼ to switch item & by ◄ or ► to assign the gateway number.

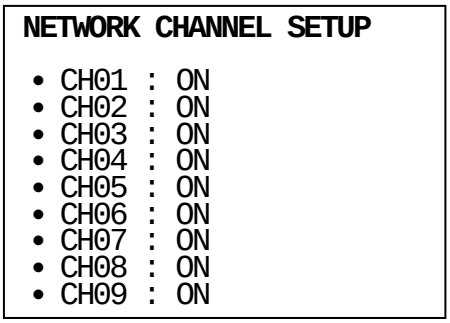
C. SUB NET
By ▲ or ▼ to switch item & by ◄ or ► to assign the submask.

D. IP MODE
By ◄ or ► to change STATIC IP or DHCP.

E. NETWORK ENV
By ◄ or ► to change network environment.

CROSSOVER	By crossover cable link to PC directly.
LAN	Link to Local Area Network environment.
WAN	Link to Wide Area Network / INTERNET environment.

F. NETWORK CHANNEL ENABLED
Press **ENTER** key into enabled the specific channel for network.



▲ or ▼ to change item
◄ or ► to change page

G. HTTP PORT
By ▲ or ▼ to switch item & by ◄ or ► to change port number.
Preset at 80

H. STRAME PORT
By ▲ or ▼ to switch item & by ◄ or ► to change port number.
Preset at 5000.

4.11 FIRMWARE UPDATE

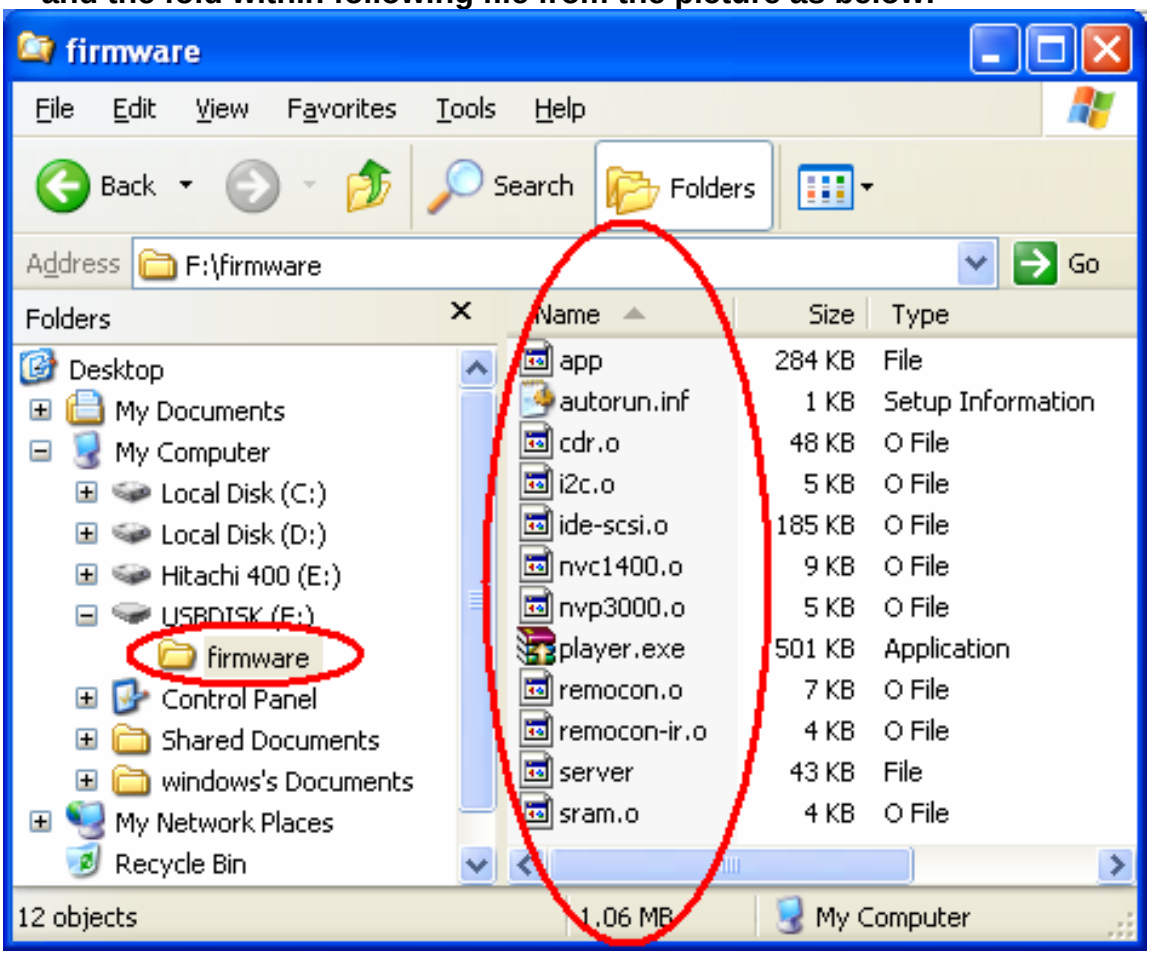
FIRMWARE UPDATE
FIRMWARE UPDATE START [<]

Press ENTER to start firmware update, but please confirm following steps.

!!CAUTION!!
Please make sure your firmware mode & version!
Wrong version firmware would make system damaged!

Update steps:

1. Confirm the firmware must in the fold named "firmware", and the fold within following file from the picture as below:



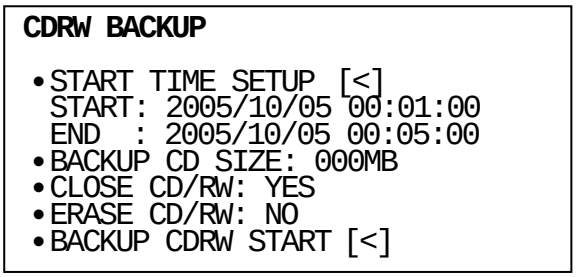
2. Plug the USB flash disk into USB connector.

3. Get into "FIRMWARE UPDATE" item & press ENTER to start update.

4. System would show “FIRMWARE UPDATING” while updating.

5. After updated the screen would show "PLEASE SYSTEM REBOOT", and than please restart DVR.

4.12 CDRW BACKUP


CDRW BACKUP
• START TIME SETUP [<]
START: 2005/10/05 00:01:00
END : 2005/10/05 00:05:00
• BACKUP CD SIZE: 000MB
• CLOSE CD/RW: YES
• ERASE CD/RW: NO
• BACKUP CDRW START [<]

▲ or ▼ to change item
◄ or ► to change page

A. START TIME SETUP

Press **ENTER** key into START TIME SETUP diagram,
and by ▲ or ▼ to change number & by ◄ or ► to switch item,
press **ENTER** key again confirm the start time,
system would check the start time automatically and back to CDRW BAKCUP.

B. BACKUP CD SIZE

By ◄ or ► to decide backup size and the END time will changed automatically, and every 1 minute would copy 2MB data into CD disk.

C. CLOSE CD/RW

By ◄ or ► to decide close the CD disk or not.

YES: Close CD R/W disk and can't write in any more.
System would block the inner ring on the disk, and no more data can't be write, otherwise using CDRW disk & Erase Disk function.

NO: Keep CD R/W in writable status until disk full.

D. ERASE CD/RW

By ◄ or ► to decide close the CD disk or not.

YES: Erase all data on the CD R/W before START BACKUP.
System would remove all data on the CDRW disk, CD-R can't be.

NO: Keep all data on the disk and add new file on the CD R/W.

E. BACKUP CDRW START

Press **ENTER** to start CDRW backup.

If without CD disk in the CDRW recorder, please put the CD disk in and repress the **ENTER** to start CDRW backup.

After backup finish CDRW recorder would eject automatically.

F. BACKUP FILE NAME

Each backup file will named as the time when backup, as like:
10061817.05 will be Oct 6th 18:17 channel 5.

4.13 LOAD DEFAULT

Press **ENTER** to load the system default setting, and **"LOAD DEFAULT !"** would shown on the screen until restore finish.

5 DVR PLAYBACK

```
QUICK TIME SEARCH
 • PLAY TIME SEARCH
 • EVENT LIST SEARCH
```

During live viewing modes and press **PLAY** or **PB** key into quick time search mode, by ▲ or ▼ to enter search mode.

5.1 PLAY TIME SEARCH

```
PLAY TIME SEARCH
    YYYY/MM/DD  HH:MM:SS
    2005/10/10  00:01:00

[MASTER HDD]
START TIME:
    2005/10/01  00:00:00
END   TIME:
    2005/10/10  00:00:00
[MASTER HDD]
START TIME:
    2005/10/10  00:00:00
END   TIME:
    2005/10/20  00:00:00
```

By ▲ or ▼ to switch item & by ◄ or ► to change port number, and than press **ENTER** key to start playback, press **LIVE** back to live viewing.

5.2 EVENT LIST SEARCH

```
EVENT LIST   MASTER  PAGE : 001
NO  YY/MM/DD  HH:MM:SS  CH  TYPE
01  05/10/10  00:01:00  --  POWER
02  05/10/10  00:02:00  --  RECORD
03  05/10/10  00:03:00  01  V.LOSE
04  05/10/10  00:04:00  02  ALARM
05  05/10/10  00:05:00  03  MOTION
06  05/10/10  00:06:00  --  POWER
07  05/10/10  00:07:00  --  RECORD
08  05/10/10  00:08:00  01  V.LOSE
09  05/10/10  00:09:00  02  ALARM
10  05/10/10  00:10:00  03  MOTION
```

By ▲ or ▼ to switch item and press **ENTER** key to start playback, press **LIVE** back to live viewing.

5.3 LIVE VIDEO DURING PLAYBACK

During playback in 8CH or 13CH screen mode, the main channel would show the live video and others in playback mode.

Switch live video channel: Press channel number.

Select others playback channel: Press **SEL** key.

5.4 USB BACKUP

Every USB flash disk powered with difference USB driver IC, here compatible with most USB flash disk, please refer to APPENDIX C for USB DISK support list, if meet incompatible issue.

BEFORE BACKUP

A. Press the USB disk volume into USB port in the live viewing mode

B. Get into playback mode by time search or event list search, and playing the video.

VIDEO BACKUP

During multiplexer or single full channel mode press the **COPY** bottom at the time point to start the backup, and press the **COPY** bottom again to stop backup, and than system would saving video into USB disk.

PICTURE BACKUP

During single full channel mode pause the screen and press the **COPY** bottom, and than system would saving the picture into USB disk.

BACKUPED FILE NAME

Each backup file will named as the time when backup, as like:
10061817.05 will be Oct 6th 18:17 channel 5**.**

AFTER BACKUP

After USB backup system would saving, the playback software “player.exe” to playback.

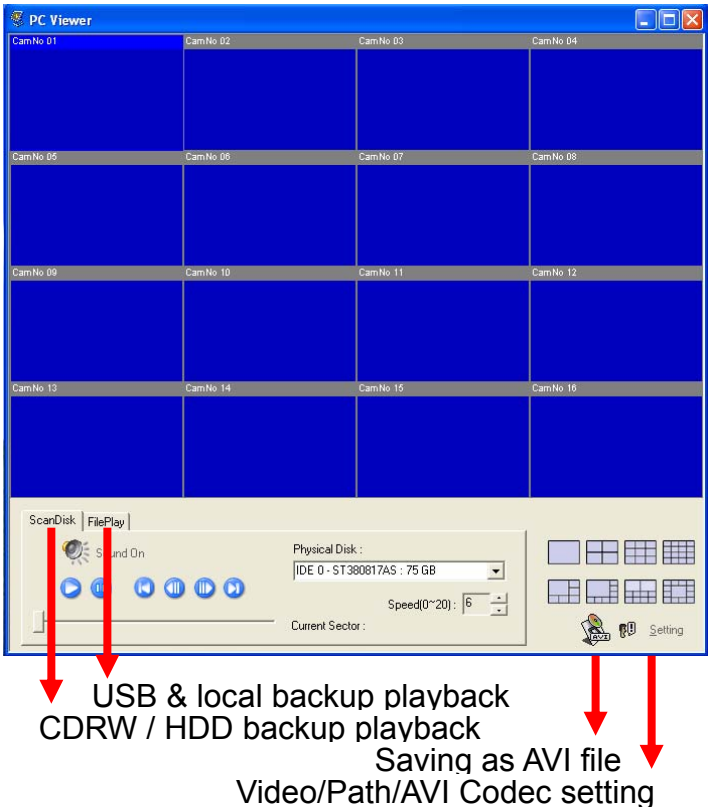
6 BACKUP PLAYBACK

SYSTEM REQUIREMENT

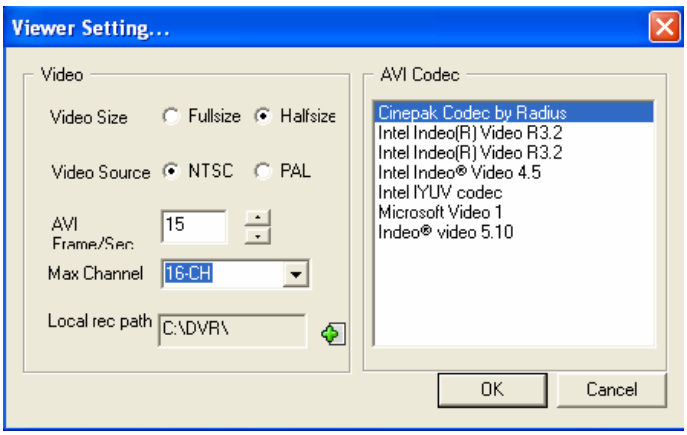
CPU: Intel Pentium III 1G or above.
MEMORY: 512 MB or above.
VGA: 32MB/64MB or above.
OS: Microsoft Windows XP SP2 or above.
VGA RESOLUTION: 1024*768 or above.

6.1 MAIN SCREEN SETTING

A. MAIN SCREEN



Click on SETTING bottom into Network viewer setting & confirm following item:



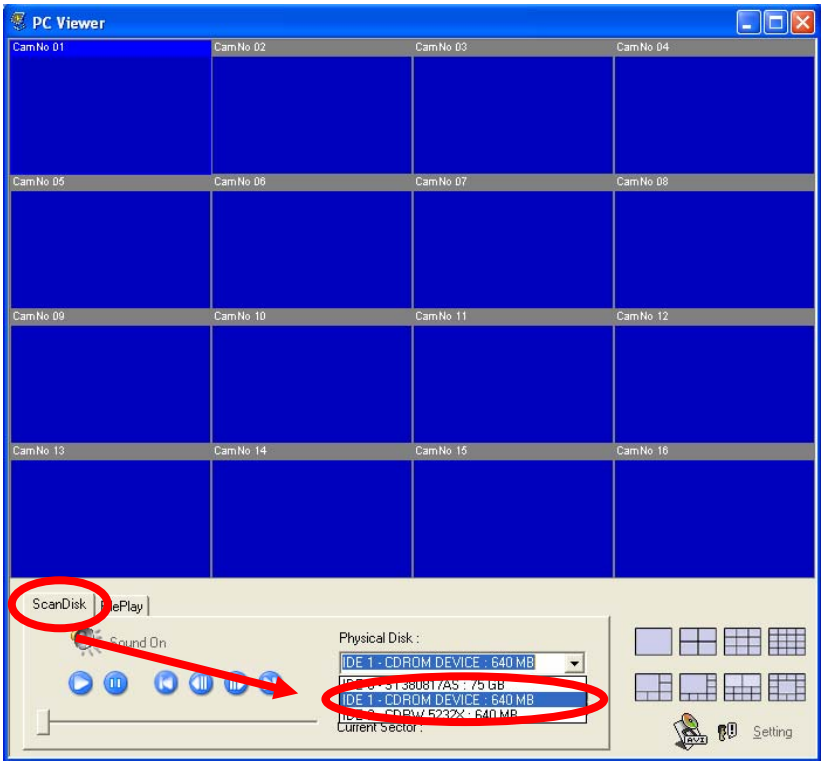
Video
Check the item for video size, system & frame pre second.

AVI Codec
Pick a codec for the video transform into AVI, each codec with differ advantage, here recommend for Microsoft or Windows for must popular usage.

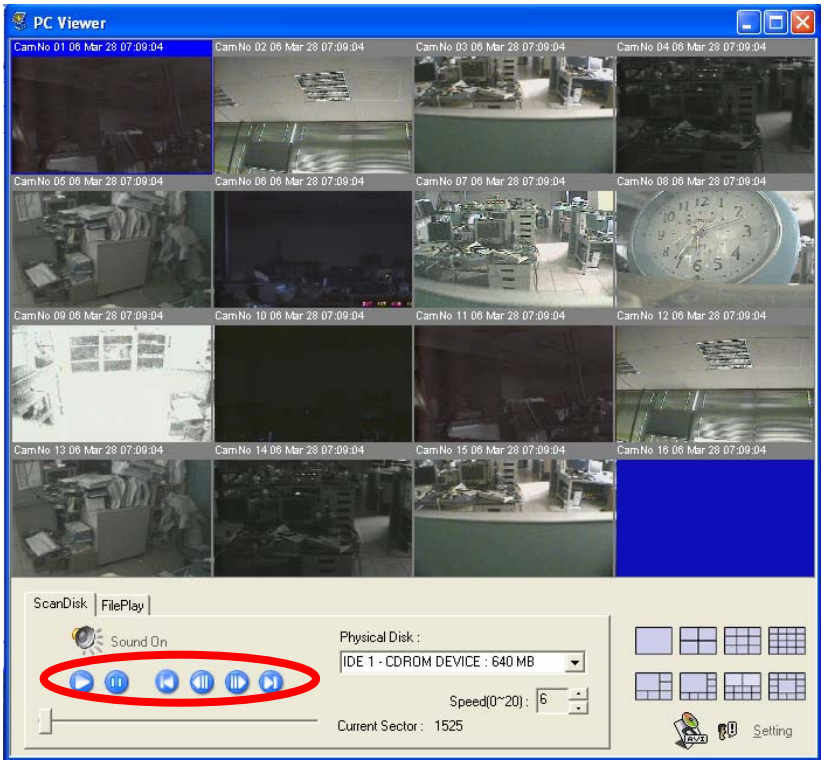
.

6.2 CDRW / HDD BACKUP PLAYBACK

A. Insert the CD disk into CDROM, the software will auto pop out, and select "ScanDisk" and pick the physical disk which CD disk inside.

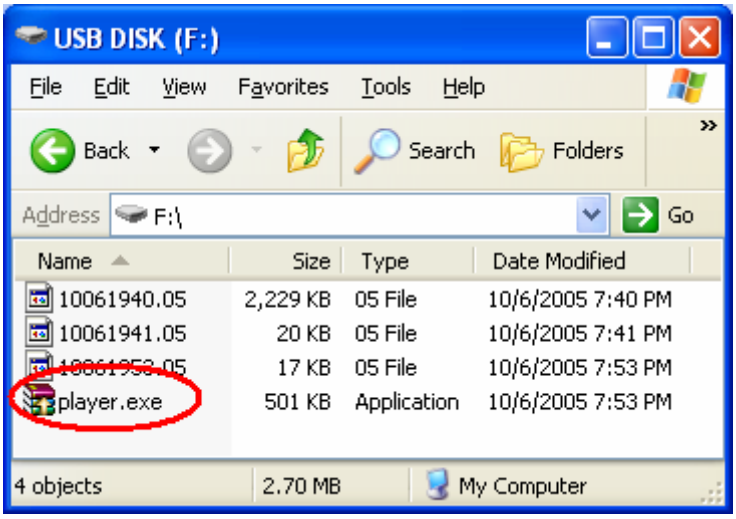


B. Press the play icon to play the video.

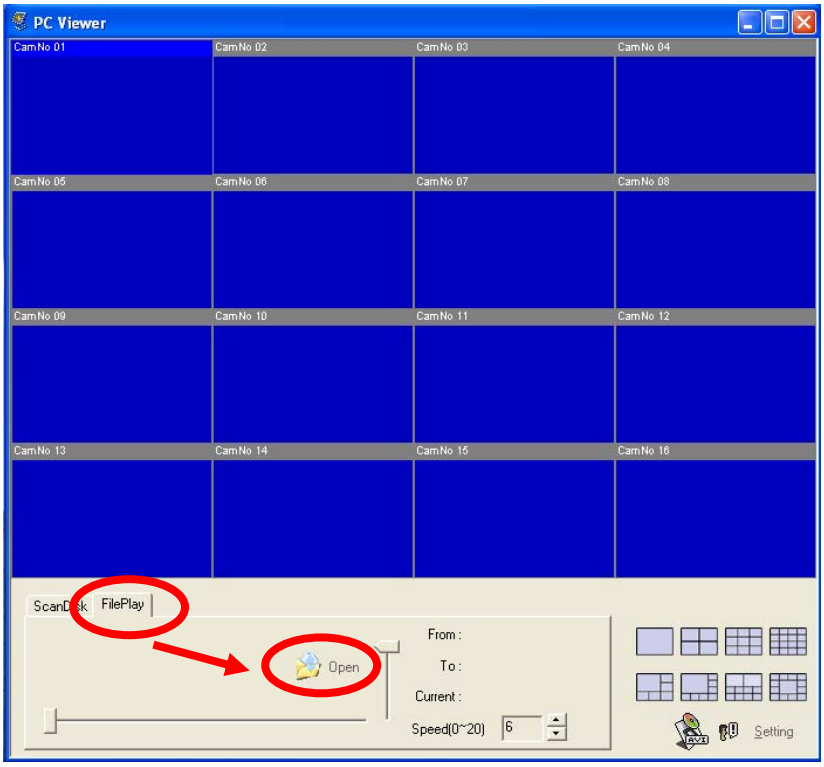


6.3 USB & LOCAL BACKUP FILE PLAYBACK

A. Plug the USB disk into PC or check the local backup folder.
If using USB mode, please double click the player.exe from the pop-up diagram. (As below)

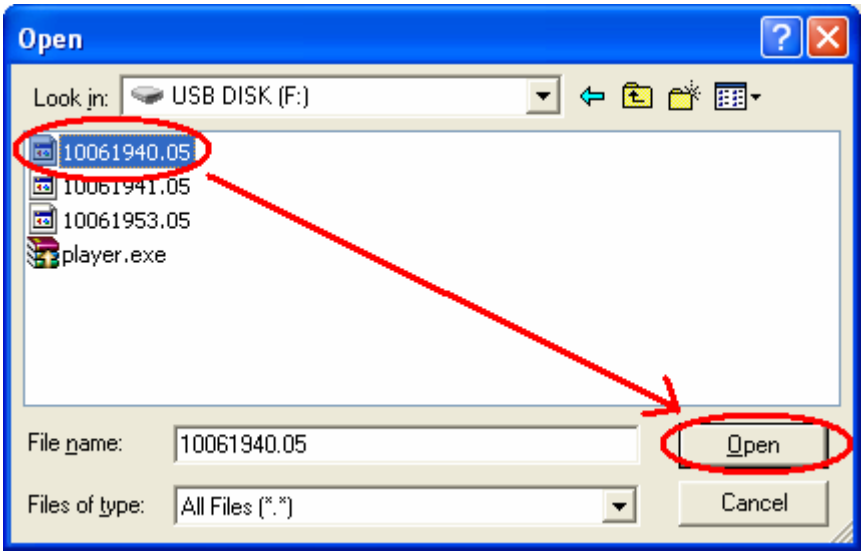

USB DISK (F:)
File Edit View Favorites Tools Help
Back Search Folders
Address F:\ Go
Name Size Type Date Modified
10061940.05 2,229 KB 05 File 10/6/2005 7:40 PM
10061941.05 20 KB 05 File 10/6/2005 7:41 PM
10061958.05 17 KB 05 File 10/6/2005 7:53 PM
player.exe 501 KB Application 10/6/2005 7:53 PM
4 objects 2.70 MB My Computer

B. The play backup program would appear on the screen, select "FilePlay" and "Open".

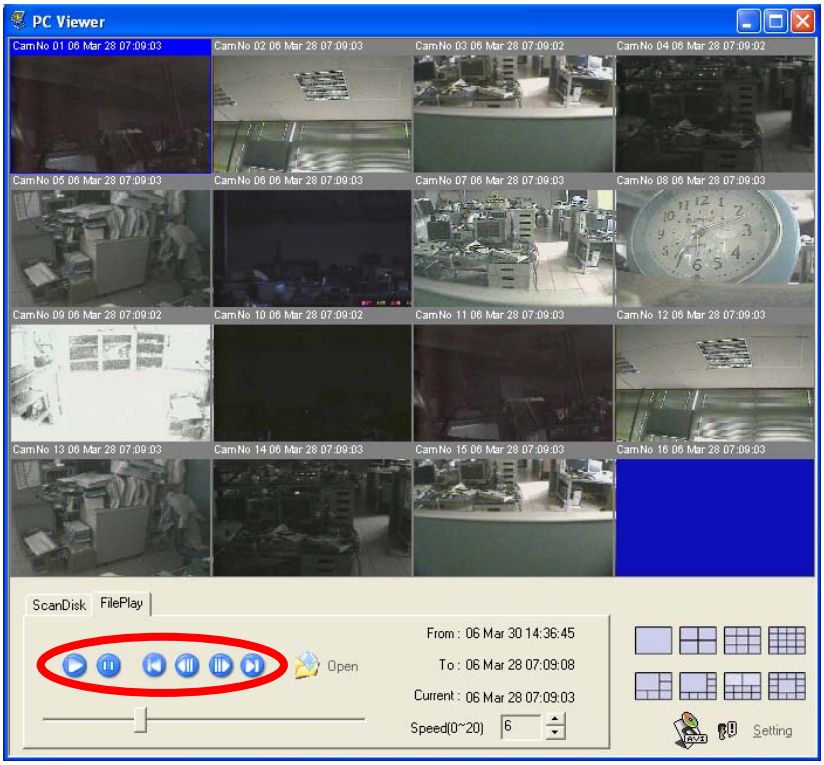


C. Open the USB disk located driver letter. (Example F:) or the local backup folder, and pick the file to playback.

The backup file will named as the time when backup, as like: 10061940.05 will be Oct 6th 19:40 channel 5.



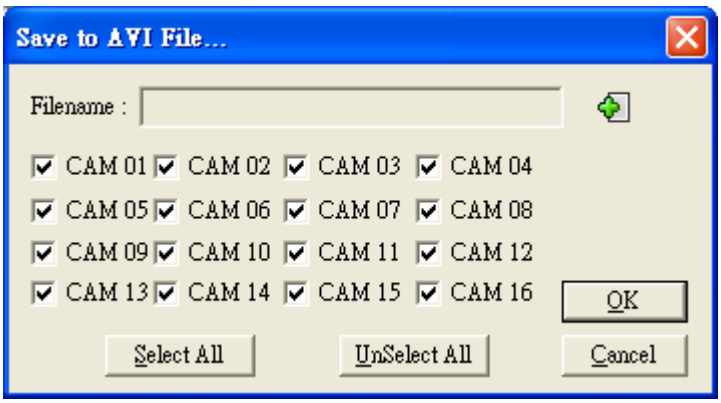
D. Press the play icon to play the video or still picture.



6.4 BACKUP FILE TO AVI

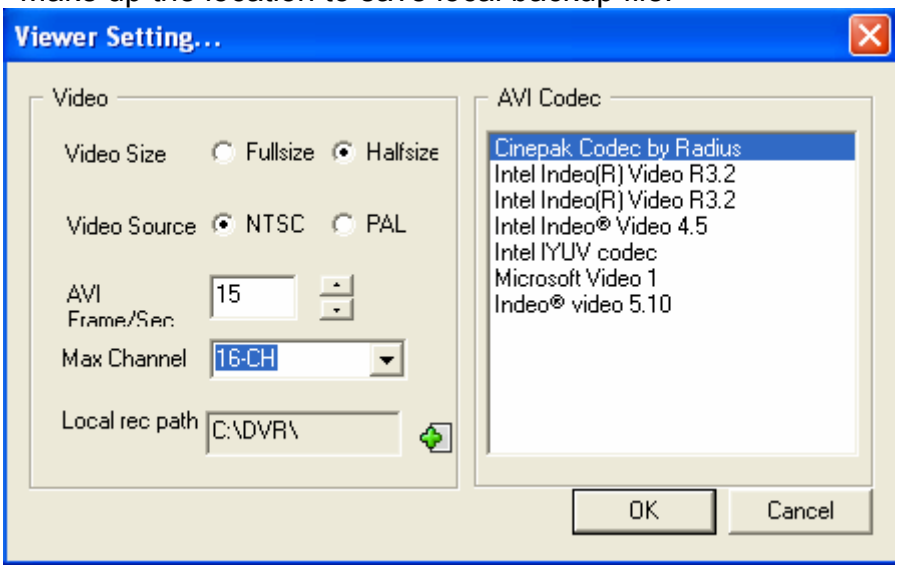
A. During video playback mode and press AVI bottom following "AVI Save" dialog will appear on the screen.

B. Make up a filename and path than press **OK** bottom to start AVI backup, and the AVI transform indication would in green.
(Recommend check all camera channel box, system would neglect these channels to backup if without video signal.)


Save to AVI File...
Filename :
CAM 01 CAM 02 CAM 03 CAM 04
CAM 05 CAM 06 CAM 07 CAM 08
CAM 09 CAM 10 CAM 11 CAM 12
CAM 13 CAM 14 CAM 15 CAM 16
OK
Select All
UnSelect All
Cancel

6.5 LOCAL BACKUP

A. Before backup please click on **SETTING** bottom into Local record path. Make up the location to save local backup file.



B. During video playback mode and press LOCAL bottom and the LOCAL indication light would be in green.

7 NETWORK VIEWING & PLAYBACK

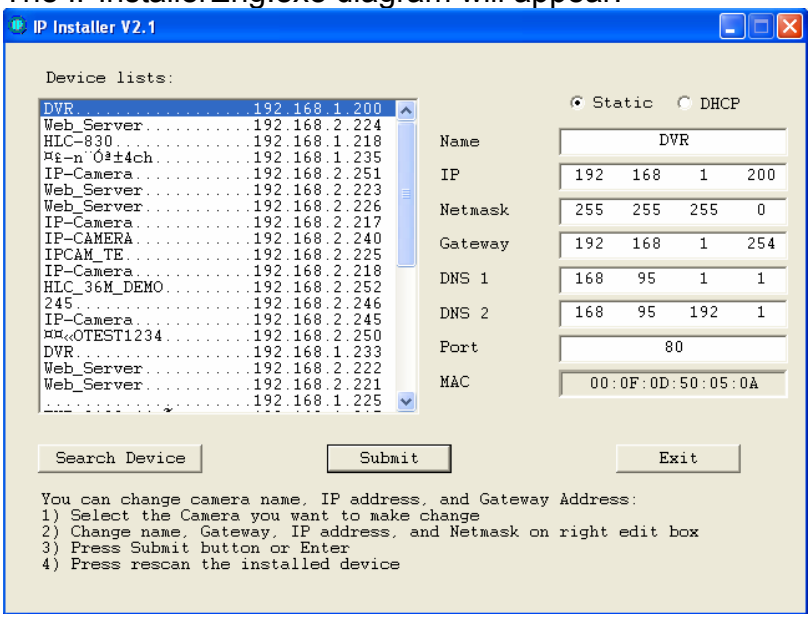
CPU: Intel Pentium III 1G or above.
MEMORY: 512 MB or above.
VGA: 32MB/64MB or above.
OS: Microsoft Windows XP SP2 or above.
VGA RESOLUTION: 1024*768 or above.

7.1 SETUP IP ADDRESS ON PC SITE

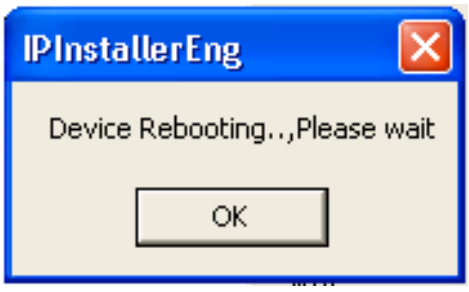
Install the machine inside the LAN internal network or utilize cross-over interlaced network cable directly (in the accessories pack) and one computer to conduct direct connection. This step is to set the IP position of the IP Cam by IPInsatller.
If Windows XP SP2 or above the security alert occur, please click on **Unblock**.

Windows Security Alert
To help protect your computer, Windows Firewall has blocked some features of this program.
Do you want to keep blocking this program?
Name: IPInstaller V2.0 IPCam Scan
Publisher: Unknown
Keep Blocking
Unblock
Ask Me Later
Windows Firewall has blocked this program from accepting connections from the Internet or a network. If you recognize the program or trust the publisher, you can unblock it. When should I unblock a program?

The IPInstallerEng.exe diagram will appear:



Attention: Please input correct network parameters. No space is allowed between characters.



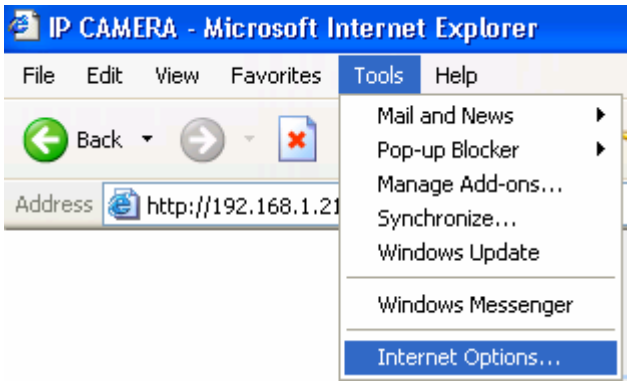
The Device lists on the left will list out all IP Cam on LAN by **Search Device** button. When the equipment is pointed by the mouse, the right side will show the parameters of various networks. Various parameters can be revised on it and by pressing the **"Submit"** on the lower part; the revision will complete and following diagram appear.

7.2 OPTIONAL MICROSOFT INTERNET EXPLORER SETTING: OPTION 1: DISABLE ACTIVEX WARNING

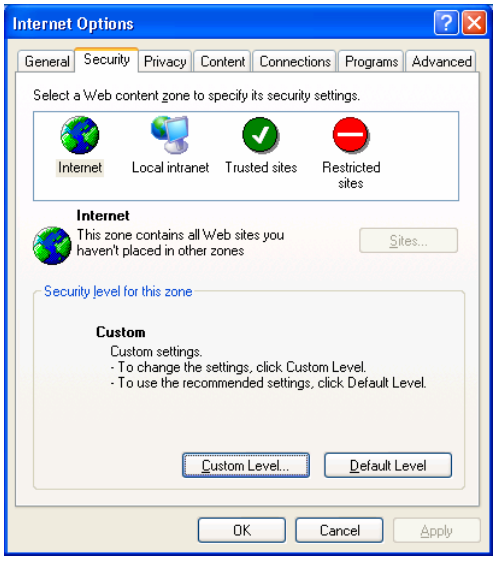
A. IE → Tools→ Internet Options→ Security→ Custom Level→ Security Settings→ Download unsigned ActiveX controls →Enabled or Prompt (recommend).

B. IE → Tools→ Internet Options→ Security→ Custom Level→ Security Settings→ Initialize and script ActiveX controls not marked as safe →Enabled or Prompt (recommend).

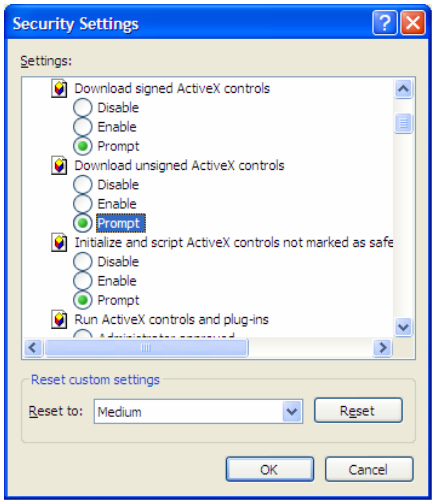
1



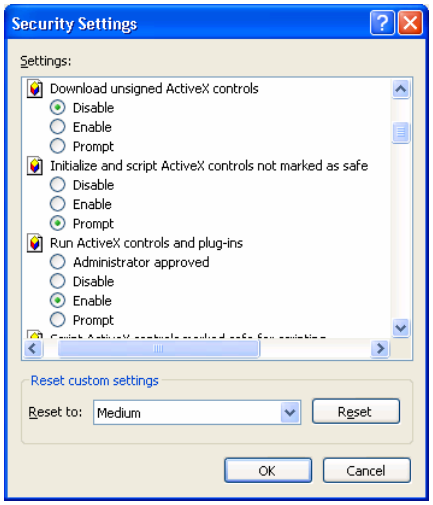
2



3



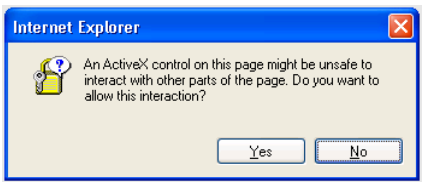
4



5

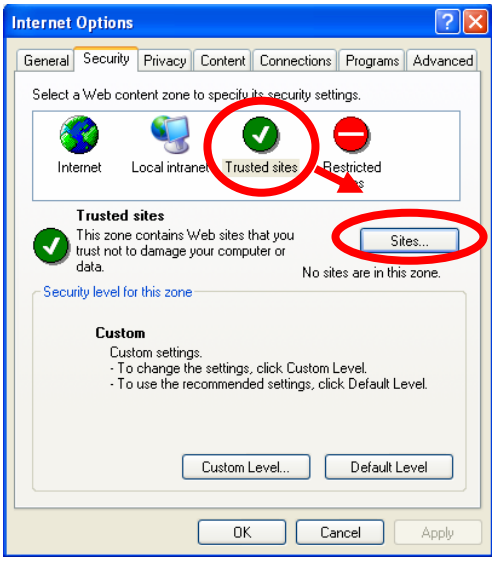
Above three options are all based on select as the prompt.

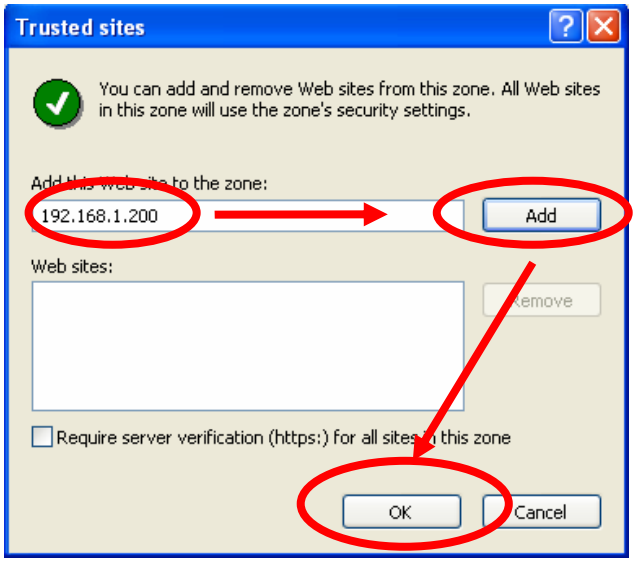
As indicated in the diagram. Please select "YES"


Internet Explorer
An ActiveX control on this page might be unsafe to interact with other parts of the page. Do you want to allow this interaction?
Yes
No

OPTION 2: ADD TO TRUSTED SITES

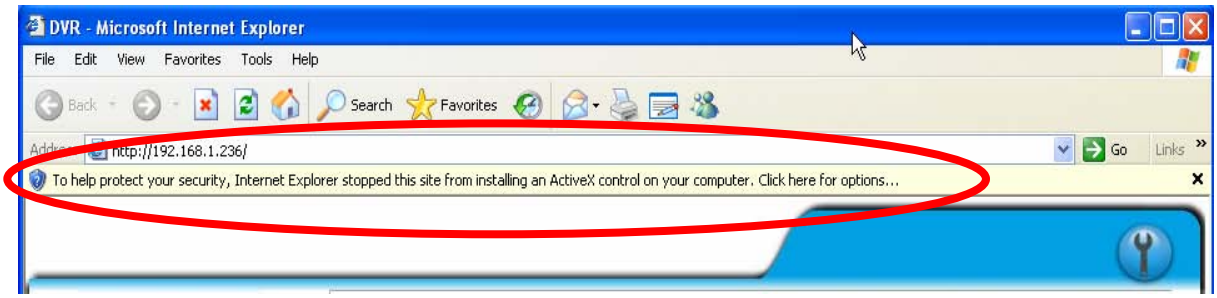
IE → Tools→ Internet Options→ Security→ Trusted sites→ Sites



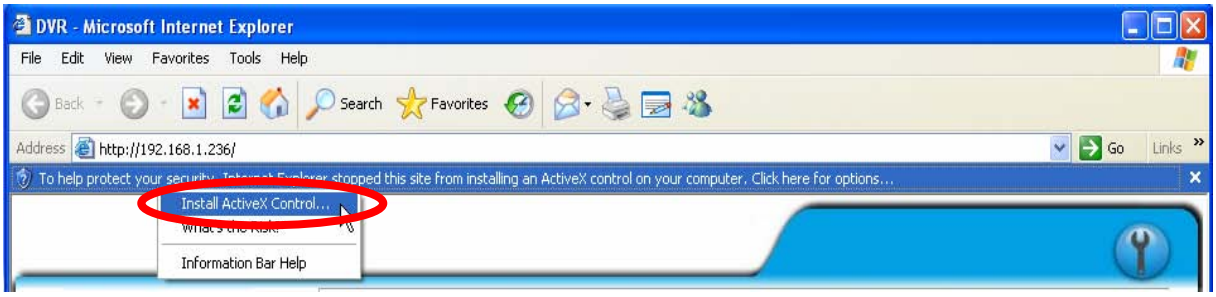

Trusted sites
You can add and remove Web sites from this zone. All Web sites in this zone will use the zone's security settings.
Add this Web site to the zone:
192.168.1.200
Add
Web sites:
Remove
Require server verification (https:) for all sites in this zone
OK
Cancel

7.3 LOGIN

A. INSTALL ACTIVEX

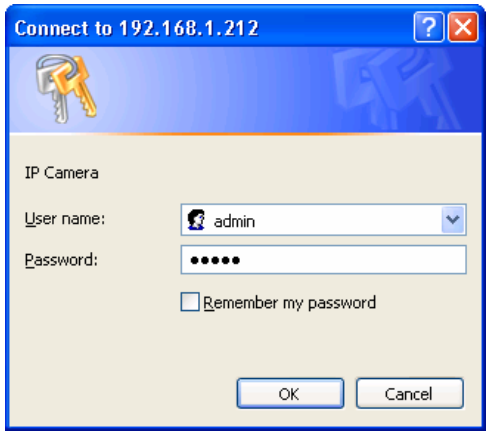

DVR - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://192.168.1.236/
Go Links
To help protect your security, Internet Explorer stopped this site from installing an ActiveX control on your computer. Click here for options...

B. START INSTALL ACTIVEX


DVR - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://192.168.1.236/
Go Links
To help protect your security, Internet Explorer stopped this site from installing an ActiveX control on your computer. Click here for options...
Install ActiveX Control...
Information Bar Help

C. ACCOUNT & PASSWORD LOGIN

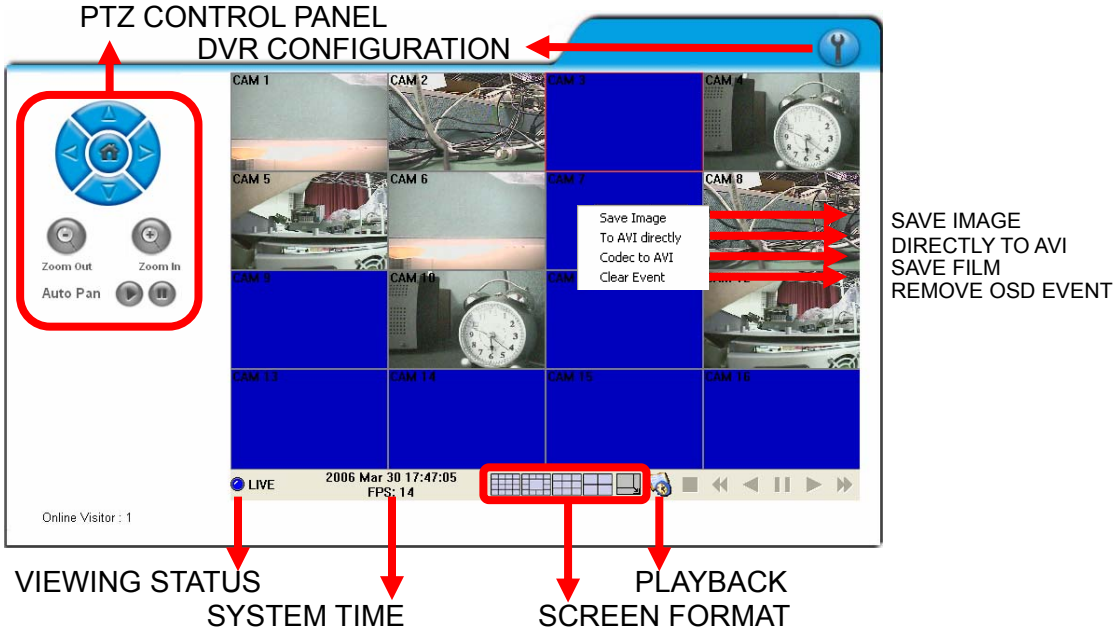
After setting up the IP based on the above step, connect to the intended network or LAN. Execute IE directly on PC. Directly input IP to conduct on-line and following User Management diagram occur and default administrator as below:



User name: admin

Password: admin

7.4 LIVE VIEWING
7.5 LIVE VIEWING



- **PTZ CONTROL PANEL**
  After set the PTZ setting on DVR site, just click on the channel which went to control, and using PTZ CONTROL PANEL to control PTZ camera.

- **DVR CONFIGURATION**
  Get into DVR network menu.

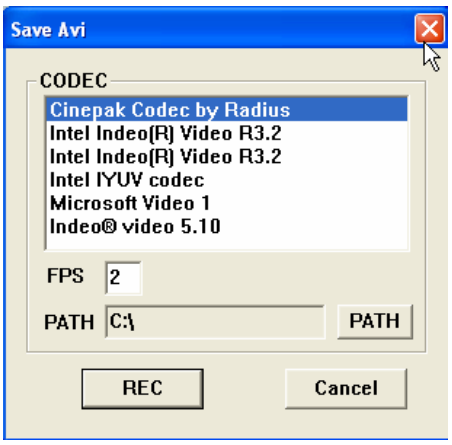
- **VIEWING STATUS**
  Blue for live viewing mode, Red for playback mode.

- **SYSTEM TIME**
  Live viewing mode: The current live viewing time.
  Playback mode: The position of the playback.

- **SCREEN FORMAT**
  Screen split mode, and continuously click for difference channel set.

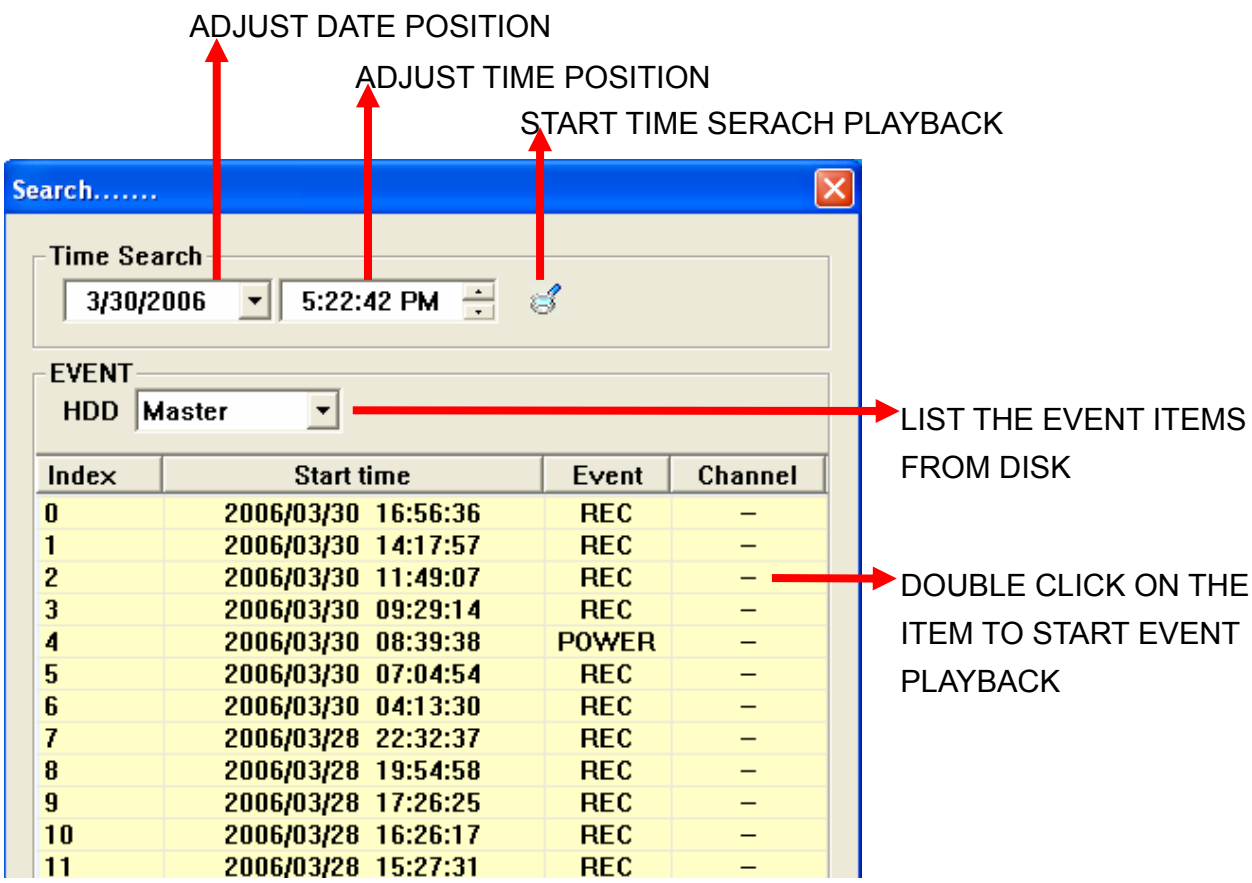
- **PLAYBACK**
  Get into playback mode.

- **RIGHT CLICK**
  - SAVE IMAGE
  Saving current image as JPG picture.
  - TO AVI DIRECTLY
  Saving video to AVI compress from BMP file.
  - CODEC TO AVI
  Saving video from selected codec to AVI file.
  - CLEAR EVENT
  Remove OSD notification event.

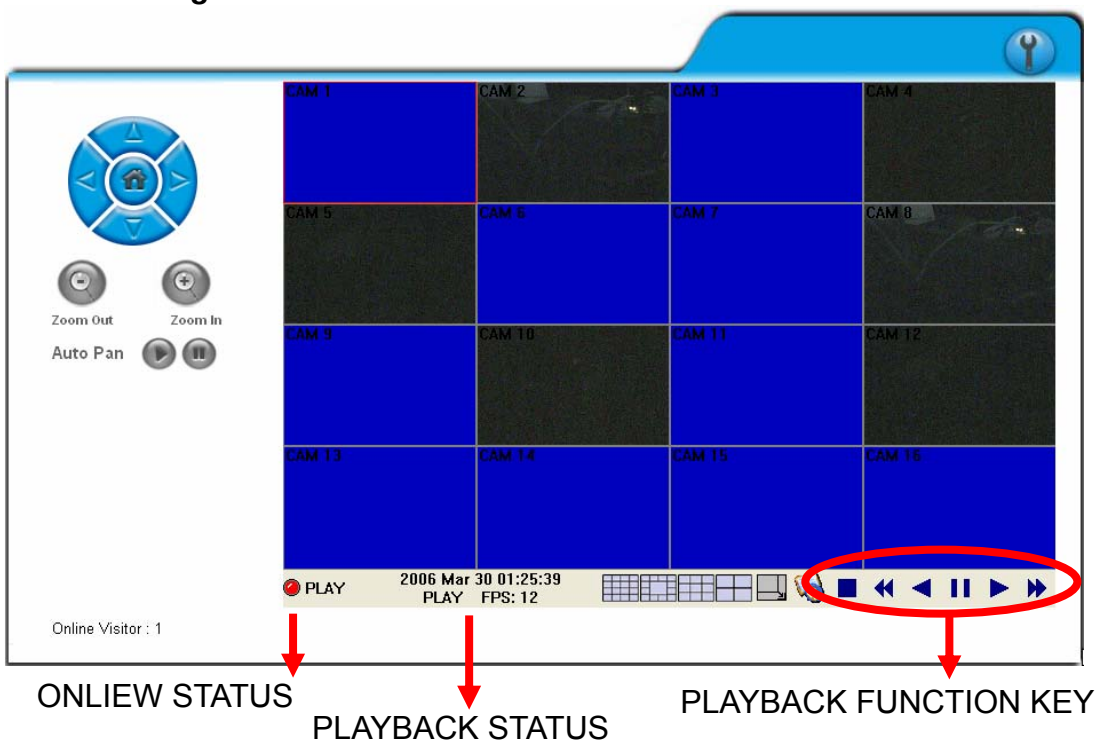


7.6 PLAYBACK

Click on the **PLAYBACK icon get into playback menu.**



Using "PLAYBACK FUNCTION KEY" to change location, and with **STOP key back to living mode.**



7.7 CONFIGURE

A. SYSTEM / SYSTEM INFOMATION

- **SYSTEM INFORMATION**

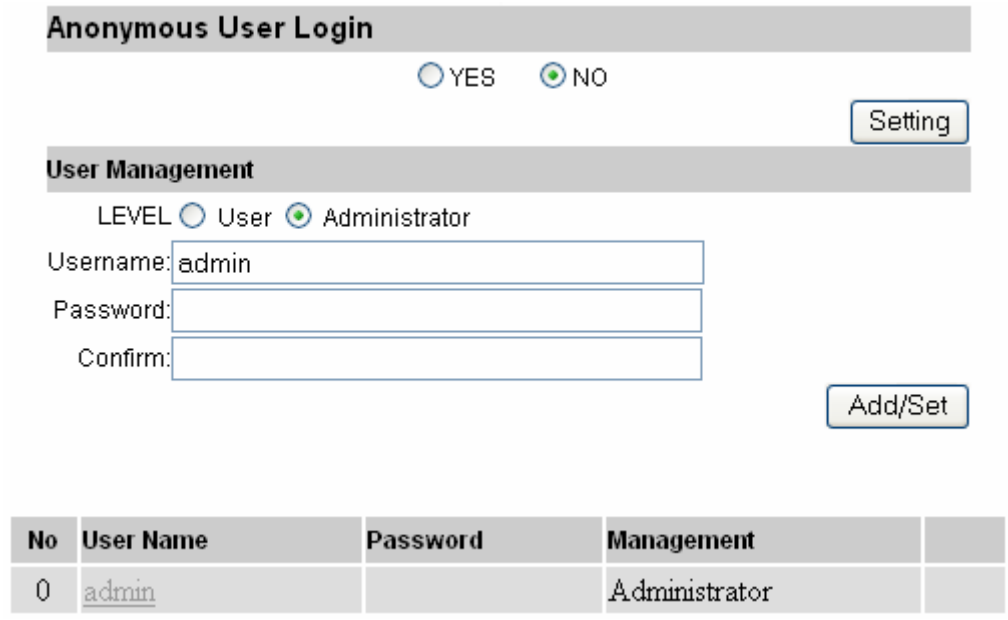
  SERVER NAME: This name will show on the IP Installer.

  LANGUAGE SETTING: There are English, Traditional Chinese, and Simple Chinese to select. When change, it will show the following dialogue box for the confirmation of changing language.

- **NTP SETTING**

  SET NTP SERVER: Synchronize with Network Time Protocol server from Port 123, after press **Apply** key.

B. SYSTEM / USER MANAGEMENT



User Management provides 3 layers: Administrator (highest), User & Anonymous login.

Default administrator account: Username: admin Password: admin

- **ANONYMOUS USER LOGIN:**

  YES Accept anonymous user login without password as guest login.

  NO Anonymous login unacceptable.

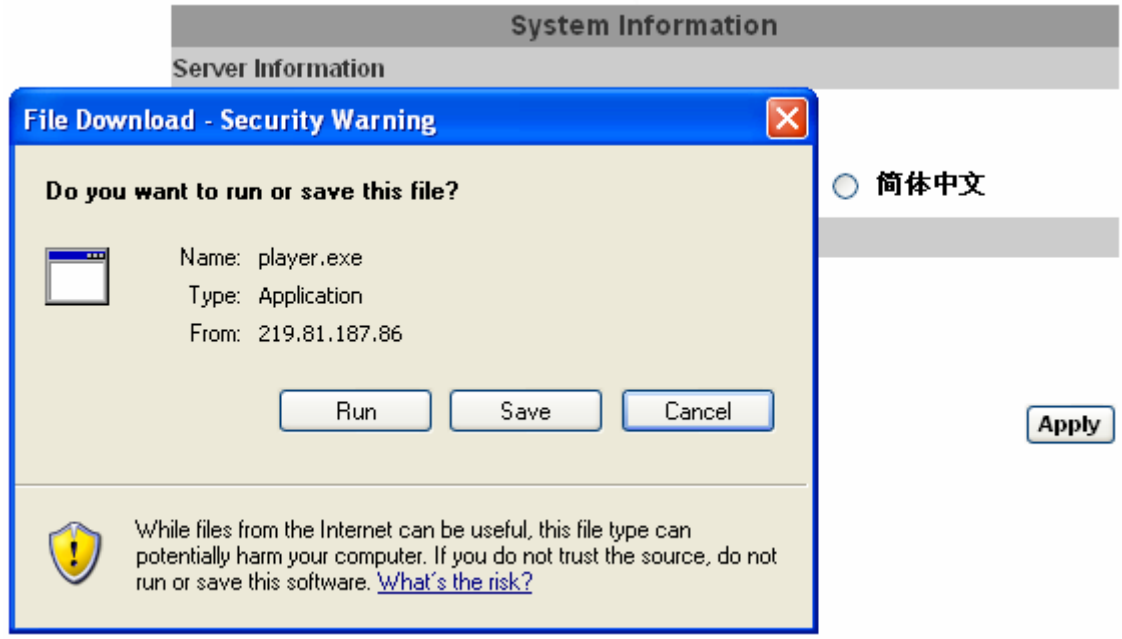
- **USER MANAGEMENT:**

  Add user: Key in HTTP Username, Password and than **Add/Set** key to save.

  Modify user: Check the account want to modify from User list, modify on User Management form directly and than **Add/Set** key to save.

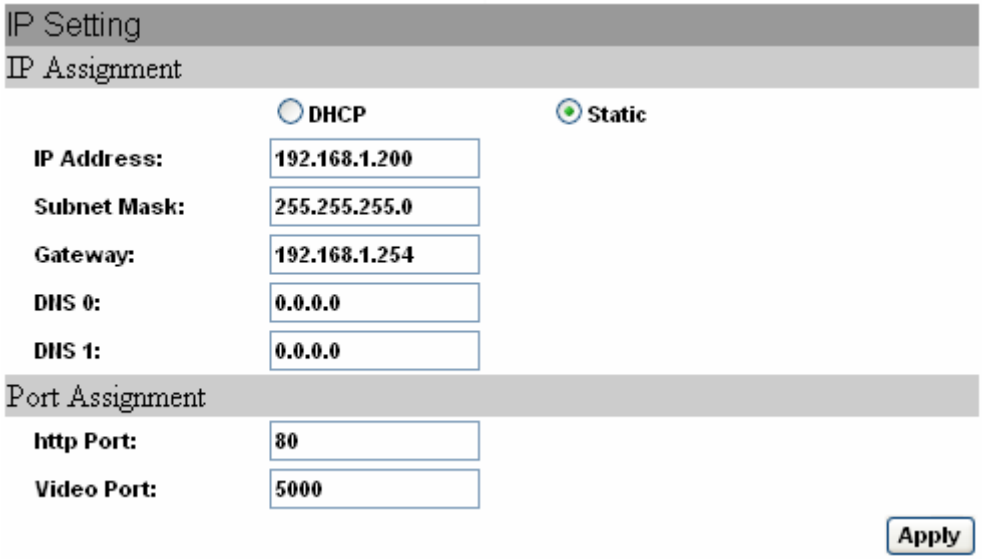
  Delete user: User name will list out names of all users. Very bottom side "admin" is the highest level user and cannot be deleted. Others are general users. After it is being pointed, press **Delete** key to delete.

C. SYSTEM / DOWNLOAD


System Information
Server Information
File Download - Security Warning
Do you want to run or save this file?
Name: player.exe
Type: Application
From: 219.81.187.86
Run
Save
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. What's the risk?
简体中文
Apply

- After click on DOWNLOAD form left tool bar, system would pop out a dialogue window for user to download NETVIEWER and named player.exe.

D. NETWORKING / IP SETTING



- **IP ASSIGNMENT**
  DHCP: Under Dynamic Host Configuration Protocol mode, your DHCP server would update related setting automatically.

  STATIC: Please key in IP Address, Subnet Mask & Gateway which depend on network each environment differ.

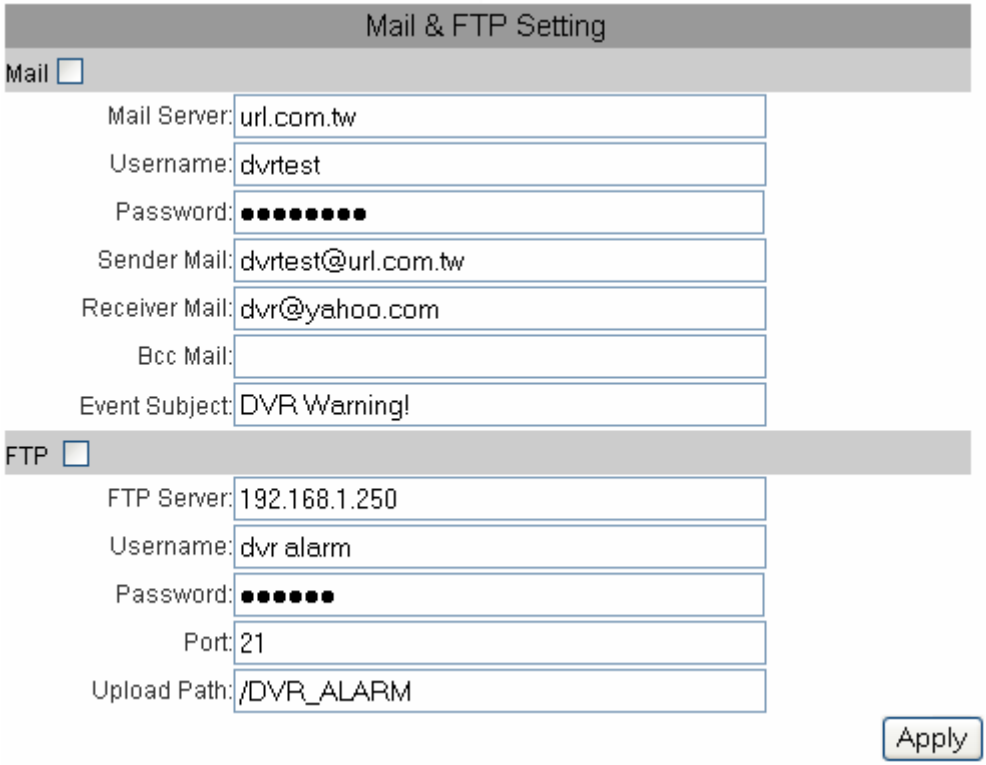
  Basically under same network environment only IP address different, but Subnet Mask & Gateway must be same.

- **PORT ASSIGNMENT**
  Under NAT or related environment following port need to mapping for virtual server setting need.

  HTTP PORT: Defaulted as 80.
  VIDEO PORT: Defaulted as 5000.

E. NETWORKING / FTP & MAIL

CHECK THE MAIL OR FTP BOX TO ENABLE NOTIFICATION FORM DVR ALARM SIGNAL.



- **MAIL**

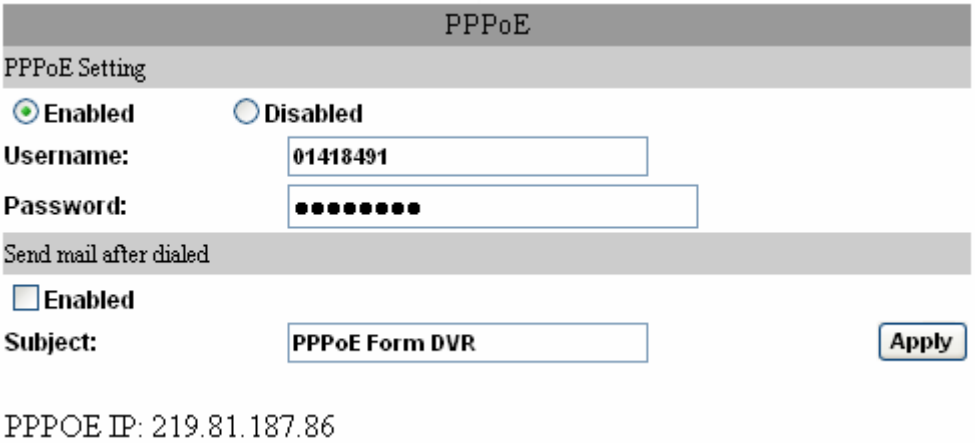
  MAIL SERVER: Email server address.
  USERNAME: Account for email server.
  PASSWORD: Password for email server.
  SENDER MAIL: Sender Email address.
  RECEIVER MAIL: Receiver Email address.
  BCC MAIL: Blind Carbon Copy Email address.
  EVENT SUBJECT: Email subject.

  User able semicolon to separate receivers in the same field, just easily add up as many receivers as you wish. For an example, below figure indicates 3 receivers are in the receiving list.
  EX: john@yahoo.com; john@hotmail.com; john@gmail.com

- **FTP**

  FTP SERVER: FTP server address.
  USERNAME: Username for FTP upload account.
  PASSWORD: Password for FTP uploads account.
  PORT: FTP service port number defaulted as 21.
  UPLOAD PATH: Default value is the root of FTP server if leave empty. Please make sure you have write privilege.

F. NETWORKING / PPPoE



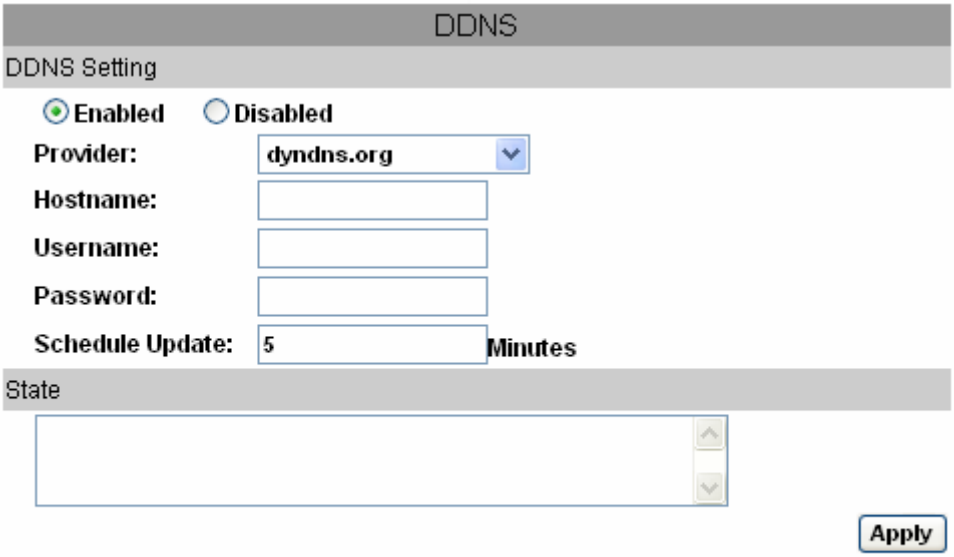
- **PPPoE SETTING**
  CHECK THE ENABLED BOX TO ENABLE ADSL DIAL UP FUNCTION.
  USERNAME: Username for ADSL account.
  PASSWORD: Password for ADSL account.

  NEW IP ADDRESS WILL SHOW UP AT THE BUTTON LINE, WHILE DAIL UP SUCCESSFULLY.

- **SEND MAIL AFTER DIALED**
  CHECK THE ENABLED BOX TO ENABLE EMAIL NOTIFICATION FUNCTION.
  SUBJECT: Email title for ADSL dial up notification.

G. NETWORKING / DDNS

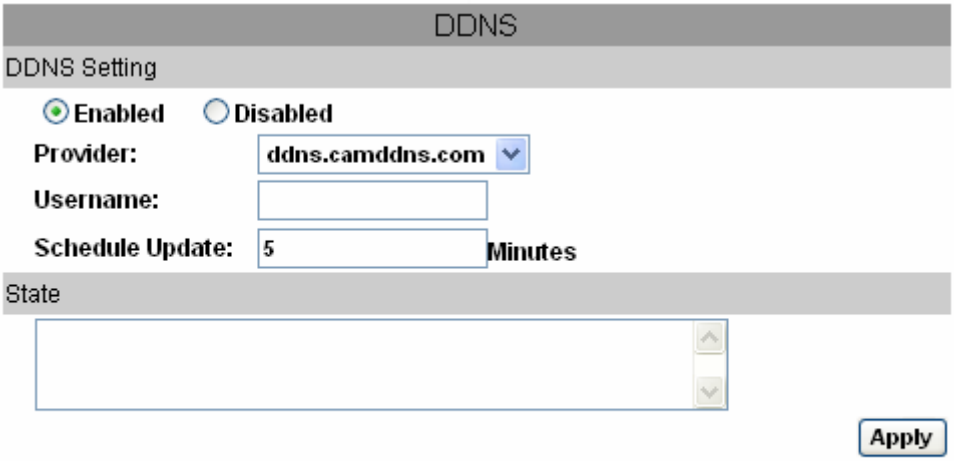
CHECK THE ENABLED BOX TO ENABLE DDNS FUNCTION.
DYNDNS.ORG



Schedule Update: Feature of DDNS schedule update is designed for IP products which installed behind the ICS or NAT devices. Update range from every 5 (minutes) to 5000 (minutes) and 0 remain to off.

- **DDNS SETTING - DYNDNS.ORG**
  PROVIDER: Pick dyndns.org
  HOSTNAME: The registered hostname form DYNDNS.ORG.
  USERNAME: The registered username form DYNDNS.ORG
  PASSWORD: The registered password for username form DYNDNS.ORG
  SCHEDULE UPDATES: The period between synchronize new IP address and DDNS server.

DDNS.CAMNNDS.COM



- **DDNS SETTING – DDNS.CAMDDNS.COM**
  USERNAME: Name an account to DDNS.CAMDDNS.COM.
  SCHEDULE UPDATES: The period between synchronize new IP address and DDNS server.
- **STATE**
  1. Updating: Information update
  2. Idle: Stop service
  3. DDNS registration successful, can now log by http://<username>.ddns.camddns.com: Register successfully.
  4. Update Failed, the name is already registered: The user name has already been used. Please change it.
  5. Update Failed, please check your internet connection: Network connection failed.
  6. Update Failed, please check the account information you provide: The server, user name, and password may be wrong.

A. APPENDIX A: RECORDING TIME LAPSE

NTSC

80GB Hard Disk										
PPS (Picture Per Sec.)		120@320*240	60	30	15	10	5	3	2	1
Record Quality	Best	8 hr	9 hr	18 hr	36 hr	54 hr	108 hr	180 hr	270hr	540 hr
	High	10 hr	12	24 hr	48 hr	72 hr	144 hr	240 hr	350hr	720 hr
	Middle	14 hr	16	32 hr	64 hr	96 hr	192 hr	320 hr	480 hr	960 hr
	Low	16 hr	21	42 hr	84 hr	123 hr	246 hr	420 hr	615 hr	1260 hr
160GB Hard Disk										
PPS (Picture Per Sec.)		120@320*240	60	30	15	10	5	3	2	1
Record Quality	Best	16 hr	18	36 hr	72 hr	108 hr	216 hr	360 hr	540 hr	1080 hr
	High	20 hr	24	48 hr	96 hr	144 hr	288 hr	480 hr	700 hr	1440 hr
	Middl	28 hr	32	64 hr	128 hr	192 hr	384 hr	640 hr	960 hr	1920 hr
	Low	32 hr	42	48 hr	168 hr	246 hr	492 hr	840 hr	1230 hr	2520 hr
240GB Hard Disk										
PPS (Picture Per Sec.)		120@320*240	60	30	15	10	5	3	2	1
Record Quality	Best	24 hr	27	54 hr	108 hr	162 hr	324 hr	540 hr	810 hr	1620 hr
	High	30 hr	36	72 hr	144 hr	216 hr	432 hr	720 hr	1050 hr	2160 hr
	Middl	42 hr	48	96 hr	192 hr	288 hr	576 hr	960 hr	1440 hr	2880 hr
	Low	48 hr	63	126 hr	252 hr	369 hr	738 hr	1260 hr	1845 hr	3780 hr
400GB Hard Disk										
PPS (Picture Per Sec.)		120@320*240	60	30	15	10	5	3	2	1
Record Quality	Best	40 hr	45	90 hr	180 hr	270 hr	540 hr	900 hr	1350 hr	2700 hr
	High	50 hr	60	120 hr	240 hr	360 hr	720 hr	1200 hr	1750 hr	3600 hr
	Middl	70 hr	80	160 hr	320 hr	480 hr	960 hr	1600 hr	2400 hr	4800 hr
	Low	80 hr	105	210 hr	420 hr	615 hr	1230 hr	2100 hr	3075 hr	6300 hr

PAL

80GB Hard Disk										
PPS (Picture Per Sec.)		100@320*288	50	25	12	10	5	3	2	1
Record Quality	Best	11 hr	12 hr	24 hr	48 hr	60 hr	120 hr	192 hr	300hr	600 hr
	High	12 hr	15 hr	30 hr	60 hr	75 hr	150 hr	240 hr	375 hr	750 hr
	Middl	19 hr	23 hr	46 hr	72 hr	103 hr	230 hr	288 hr	515 hr	1030 hr
	Low	25 hr	28 hr	56 hr	112 hr	140 hr	280 hr	448 hr	700 hr	1400 hr
160GB Hard Disk										
PPS (Picture Per Sec.)		100@320*288	50	25	12	10	5	3	2	1
Record Quality	Best	22 hr	24	48 hr	96 hr	120 hr	240 hr	384 hr	600 hr	1200 hr
	High	24 hr	30	60 hr	120 hr	150 hr	300 hr	480 hr	750 hr	1500 hr
	Middl	38 hr	46	92 hr	144 hr	206 hr	460 hr	576 hr	1030 hr	2060 hr
	Low	50 hr	56	112 hr	806 hr	280 hr	560 hr	896 hr	1400 hr	2800 hr
240GB Hard Disk										
PPS (Picture Per Sec.)		100@320*288	50	25	12	10	5	3	2	1
Record Quality	Best	33 hr	36hr	72 hr	144 hr	180 hr	360 hr	576 hr	900 hr	1800 hr
	High	36 hr	45 hr	90 hr	180 hr	225 hr	450 hr	720 hr	1125 hr	2250 hr
	Middl	57 hr	69 hr	128 hr	216 hr	309 hr	690 hr	864 hr	1545 hr	3090 hr
	Low	75 hr	84 hr	168 hr	336 hr	420 hr	840 hr	1344 hr	2100 hr	4200 hr
400GB Hard Disk										
PPS (Picture Per Sec.)		100@320*288	50	25	12	10	5	3	2	1
Record Quality	Best	55 hr	60 hr	120 hr	240 hr	300 hr	600 hr	960 hr	1500 hr	3000 hr
	High	60 hr	75 hr	150 hr	300 hr	375 hr	750 hr	1200 hr	1875 hr	3750 hr
	Middl	95 hr	115	230 hr	360 hr	515 hr	1150 hr	1440 hr	2575 hr	5750 hr
	Low	125 hr	140	280 hr	560 hr	700 hr	1400 hr	2240 hr	3500 hr	7000 hr

APPENDIX B: POWER COMSUMPTION TABLE

MODE	110V				220V			
	NON-CDRW		CDRW		NON-CDRW		CDRW	
	NON-VGA	VGA	NON-VGA	VGA	NON-VGA	VGA	NON-VGA	VGA
1 HDD	27W	31W	29W	33W	27W	32W	29W	33W
2 HDD	33W	37W	35W	41W	34W	38W	36W	42W

APPENDIX C: HDD / USB COMPATIBLE LIST

Brand	Model	Capacity	Speed (rpm)
Hitachi	HDS725050KLAT80	500GB	7200 rpm
Seagate	ST380011A	80GB	7200 rpm
Seagate	ST3120023A	120GB	7200 rpm
Seagate	ST3160023A	160GB	7200 rpm
Seagate	ST3400832A	400GB	7200 rpm
Maxtor	6Y120L0	120GB	7200 rpm
Maxtor	6Y080L0	80GB	7200 rpm
Maxtor	6Y160P0	160GB	7200 rpm
Maxtor	7Y250P0-A	250GB	7200 rpm

Brand	Model	Capacity	Part No.
SanDisk	Cruzer Micro with Skins	256MB	SDCZ4256A10
Transcend	JetFlash 110	512MB	TS512MJF110
Transcend	JetFlash 110	1GB	TS1GJF110